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ORIGINAL ARTICLES.

A FEW NOTES ON THE GENERAL AND SPECIAL FEATURES OF THE ANATOMY AND HISTOLOGY OF MUCOUS MEMBRANES.*

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The importance of a correct knowledge of the structural elements of mucous membrane can be estimated when we consider their vast extent, their complexity of function, and the *rôle* they play in the etiology, the pathology and the therapy of disease.

In the early evolution of fetal development, the integument, like that of the piscatorial amphibians and batrachian species of adult life, is covered by a thick layer of mucoid material. Up to about the fifth month the surface epithelium, as well as that lining the alimentary tract, secretes mucus. At this stage differentiation of structure and function advances, while the sebaceous crypts are formed and their secretions cover the integument.

The analogy in the gross anatomy and finer elements of the skin and mucous membrance is singularly striking, and yet when we study them carefully the contrast is amply sufficient to readily explain some of the wide differences in function. Thus, each contains smooth muscle fibres, and other structural elements each identical with the other, the great distinction consisting in the relative proportion and arrangement.

The substratum of all the mucous membranes is highly vascular. The lymphoid layer is thicker than in the integument, attaining its maximum of development in the naso-pharyngal passages. The papillary layer or the *rete mucosum* is supported by a loosely formed layer of myxomatous tissue, the mucosa, with its muscle fibres, underneath which is the submucosa, with its muscle fibres, from which spring the vessels, nerves and lymphatics.

The above, with or without a glandular apparatus, constitutes what is designated as a mucous membrane. It should be remembered that we may have mucous secreting surfaces which are not mucous membranes; as in the alveolar spaces of the pulmonary air-vesicles, (which consist of only a single layer of flat epithelial plates or columnar epi-

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thelium), the semi-circular passages in the labyrinth, the renal tubules, and the lacunar pits of the ethmoidal sinuses, and in other situations.

The mucous membranes differ very widely in their consistence, thickness and mobility. For example, in the stomach the membrane is exceedingly thick and freely movable on the submucosa. In the small intestine it constitutes more than one-third of the entire thickness of the bowel, undergoing great reduction in thickness as the colon is reached; again augmenting enormously in the rectum. On the contrary, where it rests on an osseous or cartilaginous surface, its underlying stroma is so interlaced with the fibers of the periosteum that it is quite fixed at the base.

The mucous membranes which are properly so-called are all studded or clothed by four varieties of epithelium,—the flat, columnar, cuboidal, and ciliated. The mucous membrane of the bladder and the alimentary canal provides a lining investment for all the passages which drain into them. In these the epithelium at the *embouchures* is at first stratified, then as the tube ramifies and is reduced in thickness, it is lined only by a single row of cuboidal plates, the finer primitive terminal lamina being covered by pavement epithelium.

The greater part of the mucous surfaces are everywhere occupied by the openings of hollowed spaces of glands, sinuses and ducts, many of the larger proceeding from conglomerate glands, others from acinic lobules, the smaller from simple or sacculated tubes. In the mouth and naso-pharynx we notice a very large number of canalicular passages in communication with them, which, although widely differing in function, are nevertheless clad by mucous membranes. Thus we have the openings of the tear-ducts, the frontal, ethmoidal, sphenoidal and maxillary sinuses, and, indirectly, the mastoidal through the Eustachian tubes, and all the salivary glands. Imbedded in the tonsil are several deep saccular crypts with narrow orifices and tortuous passages.

Besides these, we sometimes have, as relics of defective fetal development, inclosed branchial clefts. As we descend the alimentary tract we meet that important passage which drains the secretions from the liver and pancreas, corresponding in general features.

The most important acquisition of all to him who practices the healing art, is a careful study and practical knowledge of the histologic elements of the mucous membrane and its peculiarities in the genito-urinary tract. By a careful and analytic study of the morphology of the epithelial elements of this tract an enormous flood of light is let in on a group of serious maladies of a local and constitutional origin hitherto impossible of definite recognition. We will note at the outset that the mucous membrane of the vagina is plicated or thrown into folds, that it is devoid of mucous glands and that its pavement epithelium is remarkable and characteristic for the large size of the cells.

Some recent authors have denied the existence of mucous glands in the internal uterine surfaces, but anyone who will take the trouble to decide the matter for himself will easily find indisputable evidence of fully developed utricular glands. The openings into the Fallopian tubes and their canals are lined by ciliated columnar epithelium. The ovary itself, although without tubular exit, is an epithelial organ with a quite perfect adenoid structure for the secretion and re-absorption of a mucoid substance. Indeed, the primitive and dominant physiologic element of a matured ovum is mucous in nature.

Coming to the urinary tract, we find the greatest complexity of arrangement of anatomy and peculiarities of histology of its mucous membrane. For a full and clear description of this structure, reference may be had to Heitzman's unrivalled work on this subject.

It may be said, however, that not only is the arrangement different and the histologic elements of the mucous membranes dissimilar in the urethra, the seminal tubules, the bladder, the ureter, the pelvis and the renal cortex; but in the ureter itself in its various segments the morphologic characters of the epithelium are widely dissimilar.

The most vital and essential part of a mucous membrane, its epithelial investment, is entirely avascular. The capillary loops pierce the papillary layer, penetrating the submucosa, the mucosa and the lymphoid ridge, but through ledges of epithelium they cannot penetrate.

Around and about the gland-coils and acini we may note the tortuous spiral course of the corpuscular elements, from which demonstrated physiologic fact we must conclude that this broad expanse of protoplasmic elements derives its nutrition from the fluid elements of the blood, from the plasma, through the plasmic tracts. It also incontestibly proves that all the elements, from whatever source, taken up by the blood or the lacteal vessels must first be acted upon by the stratified layers of epithelium through which they pass. Besides it shows how, as an eliminating structure, the final change takes place in the epithelium on the surface.

There are certain phenomena which would go a certain distance to controvert this view. For example, particles of quicksilver may be found in the blood after its ingestion by the stomach; and minute globules of fat as large as, or larger than, epithelium cells, may at any time be found in the lacteals.

The elder Heitzman at one time believed he had discovered openings in Lieberkuhn's crypts, which would partly account for the phenomena; but his views did not receive the approval of other eminent investigators and he later abandoned them himself.

SOME OF THE FUNCTIONS OF THE MUCOUS MEMBRANES.

First in importance, the mucous membranes and their epithelial prolongations serve as a protective mantle to the less highly vitalized elements beneath.

Second. Most of them possess the dual property of taking up and discharging various substances. With their glandular equipments in the mucosa, they occupy a leading position in all the vital and chemical changes in the body; in tissue metabolism, degenerative and regenerative processes, their place is a dominant one.

Third. In the healthy state of the system they provide formidable barriers against germ invasion or against the introduction into the system of putrescent noxious elements. With their serried, close columns of epithelial cells, they resist the ingress of, or, at all events, neutralize or destroy in a large measure, lethal elements in the atmosphere and in the food we consume.

Fourth. The regenerative power of the mucous membrane and its epithelia is most extraordinary. This is commonly noted in the parts most exposed to trauma and the action of chemical irritants, as in the mouth, the respiratory passages, the stomach, the rectum, the urinary and the gall bladder. In the genital organs of a woman it is most remarkable.

Dr. H. M. Collyer, of New York, at a late meeting of the Metropolitan Medical Society, presented one of the most extraordinary pathologic specimens on record. It consisted of a cast of the entire urethra of the male adult. The young man gave a history of a sexual infection. But here was a sort of croupous tube with all the outlines and form of the normal urethra. The doctor believed that it was the slough thrown off by gangrene. Drs. William Gottheil, Mauley, and others in the discussion declared it quite impossible that the entire urethra could be destroyed and the patient recover full functional use of the passages, as he has, and maintained that the specimen must consist only of a diphtheritic or croupous formation acquired from a female so infected. Dr. Collyer kindly allowed me to make a section of the specimen for histologic and pathologic analysis, when it was demonstrated that Dr. Collyer was correct, as it was shown that the entire mucous membrane and spongy body were detached and thrown off. But no stricture, no stenosis, nor obstruction has followed, which go to show complete regeneration of the spongy body, mucosa and all.

Fifth. Neither the urinary nor the gall bladder have any mucous glands. Repeated experiments have quite conclusively demonstrated that the normal urinary bladder possesses no absorbing power; none to poisons in solution, except the corrosive irritants. It is probable that the colon absorbs very little, or none, of its own contents, and it still remains a much disputed question whether or not the rectum and sigmoid flexure can absorb and assimilate non-digested proteids, or carbo-hydrates.

Sixth. It is well to remember that the mucous membranes in most situations are constantly shedding the worn-out surface epithelium.

TEN THINGS EITHER KNOWN OR WORTH KNOWING.

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Marie Antoinette and Louis XVI., so the story goes, might have found safety in exile had they not delayed to have a shoe nailed on the foot of one of the carriage horses. Two royal heads under the guillotine, the destiny of France changed and the history of all Europe somewhat altered by so trifling a matter as a horse losing a shoe! And this is the moral: Despise not the things of low degree.

We physicians too often see death win the contest because of some minor symptom that is beyond our power to control. Successful medication frequently depends not upon what we give, but how we give it.

Suppose a case of this kind: Obstipation of the bowels with frequent and distressing acts of vomiting. Cathartics are rejected by the stomach and enemas, though oft repeated, have entirely failed.

Plainly we must get the bowels opened, get an "action downward," and then the secretion of the stomach, now abnormally profuse, will find an outlet through the way ordained by nature.

We must give a medicine that has undoubted cathartic action. What shall it be? Epsom salts? The stomach will reject it at once. True, under ordinary circumstances, but not if prepared in this way: Put a tablespoonful in a teacup and add two or three tablespoonfuls of *boiling* water, stir well, decant and reject the residum. Add a little lemon juice, let the mixture cool and give to the patient. If in the country, beyond the reach of lemons, vinegar will make a fourth-rate substitute for the lemon juice. Repeat the dose every four hours until the bowels respond. The quantity of water may be varied to suit the caprice of the patient.

Epsom salts prepared in this manner make a draught soothing to the stomach and so agreeable to the taste that I dare say if a chemist would suggest some ingredient additional that will give it the power to make toy balloons of the human stomach, burst the corset strings of esthetic femininity and, by its regurgitant action, irritate the posterior nares, then have it dispensed by the aid of a gilded fountain with a smiling and handsome drug clerk attachment, it would rival in popularity that abominable adjunct to modern civilization called soda water.

I would claim the discovery of this plan of giving salts were it not for the fact that many years ago, thrilled by the great eloquence of Wendell Phillips when lecturing on the "Lost Arts," I became a proselyte to the doctrine that "There is nothing new under the sun."

Some two decades ago I discovered that the hypodermatic syringe was an excellent substitute for the unsatisfactory exploring needle, but about the same time all other surgeons in the civilized world made the same discovery.

All physicians have noted the annoyance caused by the piston of the syringe becoming so dry that the instrument will not work when needed, the patient with hepatic colic for example shouting for relief, while the doctor is nervously manipulating the instrument in hot water. I will risk the assertion that *some* physicians do not yet know that after use, if the syringe is placed under water with the piston withdrawn and the piston is then forced down again, a sufficient quantity of water will be pumped in *above* the piston to keep the instrument in working order for many days at least.

Soft rubber goods rapidly deteriorate by the destruction of the material of which they are made. This rotting process is supposed to be due to the action of the atmosphere and moisture. We cannot keep them in a vacuum, but my Esmarch's bandage, now fully eighteen years old, is still unimpaired; the result probably of always keeping it in a small, tightly-closed tin can, where it has been but little exposed to atmospheric changes.

It is said that an easy way to take a pill is to place it under the tongue and

take a swallow of water, while thinking of something else. The first time this plan is tried the patient is apt to look about for something he has lost, being under the impression that he has dropped the pill on the floor.

After using a thermometer of the self-registering type, the detached portion of the column of mercury is frequently jarred down again by holding the instrument between the thumb and first finger and striking the palm against the other hand. The object will be more easily accomplished by holding the instrument in the same way and giving it a quick flourish through the air, in the manner that a musical director swings the baton when he accents the music at the count, "*one.*"

After using flaxseed or other poultices in treating small children for pneumonia, there is danger of the little patient becoming chilled by the sudden discontinuance of the application. Use should immediately be made of the cotton wool jacket, which is easily constructed in this way: Take a sheet of cotton wool sufficiently large and cut a hole through the center and slip it over the child's head, and bring down the loose ends of the sheet, fore and aft. Over all place a shirt, and the child will be thoroughly enveloped down to the waist. Direct the nurse to pull out a portion of the cotton each day during convalescence until it is all removed.

When making external applications in throat troubles of a tonsillitic nature, if the bandage is placed around the neck, the remedy applied will fall below the point needed. The bandage must be brought up over the head and the ends fastened with a safety pin at the point where the two parietal bones unite with each other and with the occipital. This will bring the bandage directly over the ears, causing discomfort and annoyance, easily remedied, however, by cutting holes in the bandage for the ears to pass through. The ears will then act as a valuable aid in keeping the bandage *in situ*. Once, when using a piece of fat meat in this way, I got a valuable hint from the grandmother, who, to prevent the porcine remedy from slipping out, had stitched it fast to the bandage with a needle and thread.

Another old lady surprised me, when I was wrestling with a recalcitrant poultice which I was vainly trying to keep in juxtaposition to an abscess on the parietal prominence of a restless baby's head, by suggesting that she could hastily construct a night-cap out of a piece of old muslin. And why should not the night-cap be made a part of the well-equipped, modern surgeon's armamentarium? The proverbial old woman is not always a nuisance in the sick room. What shall we say of her, however, in the following case?

Two medical friends, reputable surgeons, were called about the third day after the receipt of the injury to attend a neglected case of incised wound of the thigh. Secondary hemorrhage was alarming. For two days they tried hemostatics, bandages, etc., and ultimately etherized the patient and searched for bleeding vessels. They found none, owing to the inflamed and suppurating condition of the wound. The following night bleeding returned, as bad as ever. An old woman in the neighborhood could "stop blood." She made some unintelligible hieroglyphics on a piece of paper and directed the messenger to take it home and tie it on the young man's ankle. This was done, the hemorrhage stopped and never returned during the healing of the wound. How did she stop that blood, or was it simply a case of *post hoc, ergo propter hoc*?

The patient was in the throes of death's alarm, his heart was thumping like a trip hammer; he had faith in the new remedy and when it was applied, his mind became calm and serene and so did his heart's action, the *vis a targo* was lessened and the hemorrhage stopped. Let us be just and give the old woman some credit. If it is the proper thing to "Give the devil his due," we must also respect the rights of his agents.

Bobby (to the visiting pastor)—Say, what is that hole in the top of your hat for?

The Pastor (wishing to be instructive)—Don't you know? Now, try and guess.

Bobby—Oh, I know! Pop says you talk through your hat, and that must be the hole it goes through.—*Puck.*

OBSERVATIONS IN ANESTHESIA WITH MODERN ANESTHETICS.

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I will merely undertake to-day to give a few observations on local and general anesthesia and the agents used in producing the condition, also with a view to its necessity in varied cases which come under the general practice of medicine, either in surgical procedure, obstetrics or in diagnosticating abdominal tumors, joint diseases, or in cases which we suspect are those of malingering.

Where the surgeon has ample time in a fixed operation, there are certain rules which should always be carried out, in order to prevent collapse, which may sometimes occur, in cases attended with shock as well as in people with fatty hearts, and in that class of cases known to possess "surgical kidney."

Heart disease, however, is not a contra-indication to surgical anesthesia. Should urin analysis show that albumin be present, the peril of operating is greater and it is necessary to proceed very cautiously, if it should be impossible to postpone the operation. Give a purgative the night previous and allow no breakfast if you intend operating in the morning, but if in the afternoon give a small amount of beef tea, coffee, or brandy, but in any event do not allow food within three hours of operation. Vomiting must occur if the stomach contains any food and if it be liquid it will do no harm, should it get into the trachea during vomiting. Yet great cardiac weakness may be produced by retching which precedes and follows anesthesia.

False teeth should be removed. A pillow should not be used unless the exigencies of the case demand it. Remove all constriction around the neck, chest and abdomen. Have near at hand and ready for immediate use a pair of tongue forceps, a hypodermatic syringe, with solutions of strychnia, alcohol, digitalis and brandy. Many surgeons give a hypodermatic injection of morphia and atropia to steady the heart prior to operating.

The two favorite anesthetics, chloroform and ether, are usually at our command. While chloroform is considered more dangerous, it is more agreeable and not so irritating to the kidneys and lungs. It is also quicker in many ways. It produces anesthesia sooner than ether, and the patient is sooner over its effects and is quieter; however, the after vomiting lasts longer than that produced by ether. Chloroform may induce a sudden and fatal syncope through paralysis of the heart; hence if there is a heart lesion use ether. Ether kills through its effect on respiration; therefore, if a bronchial or lung affection exists, chloroform should be used. If this rule be always followed the operator will always know just where to apply the means for resuscitation.

Chloroform has its advantages over ether in many cases. In patients over sixty years of age there is more or less bronchitis and ether fills the lungs with mucus and also irritates the kidneys, which at that age, are weak and diseased. Again, in children under ten years of age, ether will cause an outflow of mucus which may cause asphyxia. In obstetric cases only light and quick anesthesia is required. In operations on the mouth and face, lips and palate, chloroform is safer, unless the Trendelenberg chair is used, because it limits the flow of saliva and subdues coughing. In celiotomy ether is supposed by some to cause oozing of the blood. Ether, however, is always safe in heart disease and should be preferably used when veins are to be tied, as it causes them to be prominent. Long and tedious operations are better handled under ether.

No special inhaler is required for chloroform—a towel, a napkin or a piece of gauze folded upon itself will answer every purpose. The chloroform should be of a reliable make, and in giving it should be mixed well with air, as not over 4 per cent. of the vapor should be used. Hold the cloth above the mouth, adding five or six drops, and proceed gradually. During the stage of excitement do not desist; whichever

anesthetic is used, then is the time to push it, as vomiting may be quickly controlled and muscular relaxation may soon occur, provided vomited food has not been drawn into the larynx, or respiration is not difficult.

Respiration may be aided by keeping the tongue in a natural position. By placing a thumb on either side of the larynx and pressing upwards, the tongue will be thrown forward and unless this is done it is often necessary to reach far back into the mouth with the forceps in order to reach the tongue. Vomiting may be controlled by placing the left hand over the left clavicle and pressing at the sterno-clavicular articulation downwards and inwards with the thumb, so as to exert pressure on the pneumogastric nerve, at the same time pushing the anesthetic. Collapse is quite easy to control when the Trendelenberg chair is used, as, apart from the hypodermatic use of the agents at hand, the simple raising of the extremities soon brings the patient back to a normal state, and the operation may proceed. Artificial respiration and dilatation of the sphincter must not be overlooked in handling a severe case.

For ether anesthesia have near the same instruments and agents as for chloroform, with the addition of an inhaler. Proceed with a fresh case of ether (Squibbs) and add the agent gradually so as to gain the confidence of the patient. Never add a large amount of anesthetic; it always causes coughing. When the patient is thoroughly relaxed, if there is bleeding, diminish the amount. Do not have present either a hot iron or a light. Too rapid use of the agent causes the muscles to become rigid, the respirations rapid, and the pulse bounding. This can be avoided by proceeding slowly and cautiously, and if we do not, this stage continues, the respirations become stertorous and cyanosis is marked. When the stage of insensibility is reached the pupils are contracted, but react to light and touch. When the pupils are fully dilated, with no reflexes, discontinue the anesthetic.

In deep anesthesia the pupils are contracted. In profound anesthesia they are dilated and in neither case will they react to light. Watch the pulse carefully as well as the respiration. Syncope may be due to nausea or hemorrhage. Obstruction of air passages may be due to falling back of tongue, to closure of the epiglottis, the glottis falling to the side, or to vomited matter getting into trachea. Shocks apparent by pallor, irregular pulse, cold extremities and profuse perspiration. These conditions must be promptly met in the most active manner with the agents at hand.

If it is impossible to subdue vomiting, it should be allowed to proceed by raising the head slightly and turning to the side. Have a basin near, but do not wait for one to be brought, wipe out the mouth and proceed with the anesthesia. After the patient has been placed in a bed, artificial stimulation by hot water bottles should be used. Do not permit a pillow.

For local anesthesia freezing with ice and salt, the ether spray, ethyl chlorid, have all been used, but cocain is the first to claim attention, as it is ordinarily used. I believe it to be more dangerous than ether. Reclus gives statistics showing fourteen deaths from its use. There are certain well-defined rules to be followed in the ordinary use of the drug. To be within the limits of safety never use over two-thirds grain on a mucous surface and never over one-third grain under the skin (Da Costa). The urethra is a particularly dangerous region for its use. Thorough antisepsis must be practised. I am sure that many of you have frequently noticed ill effects following the continued use of a stock preparation, composed of cocain, atropia and carbolic acid, by a dentist who does not sterilize his instruments. Good results are obtained, however, by the proper use of cocain and to such an extent that general anesthetics are discarded for it in many minor surgical operations.

The best method to every one is that which has given satisfaction to him by its use. To me the method originated by Prof. C. L. Schleich of Berlin, in 1895, a report of which was furnished by Prof. Parvin of Philadelphia, seems the best. I refer in particular to the infiltration method of a weak solution of cocain, sodium chlorid, morphia muriate and sterilized distilled water, by means of a hypodermatic syringe, directly into the part to be operated upon.

I herewith append the formulæ of the three solutions used, although these solutions are not necessary, it having been my practice in operating on tumors, crushed fingers and toes, ingrown toe nails, fistulas, etc., to use the normal or No. 2.

No. 1. "Strong."

℞

Cocain mur	gr. .3
Morph. mur.	gr. ¼
Sod. chlor.	gr. 3
Distilled Sterilized water	f ℥iij ℥v.

No. 2. "Normal."

Cocain mur	gr. 1½
Morph. mur.	gr. ¼
Sod. chlor.	gr. 3
Distilled sterilized water	f ℥iij ℥v.

No. 3. "Weak."

Cocain mur	gr. 1-6
Morph. mur.	gr. 2-5
Sod. chlor.	gr. 3
Distilled sterilized water	f ℥iij ℥v.

One per cent formalin solution may be added to preserve the solution in a more aseptic condition. Either No. 1 or 2 are used in ordinary cases, while No. 3 may be used where anesthesia of the deeper structures is required in a prolonged operation.

The preparation which has given most satisfaction to me is eucain hydrochlorate. It is a recent preparation which has proven to be far superior to cocain, from the fact that its use is devoid of the danger of the latter. It is produced by the action of ammonia on acetone. It is practically non-poisonous and the anesthetic effect produced is greater and more lasting than that produced by cocain. In eye surgery it presents advantages by the fact that it does not dilate the pupil nor affect the accommodation and it does not decompose if kept for a period of time.

Inhalation of chloroform and ether, while producing the desired result has the drawback of over-doing the thing by bringing on general insensibility of all the body. This undesired and unnecessary surplus result logically explains all the evil consequences following their use, foremost among which is loss of life. Compression of different nerves and constriction has little effect. Cold is superficial and produces a necrotic effect on the tissues involved. Cocain acts directly on the nerve cells, as it is a cell poison. Water infiltration will cause local anesthesia. With a syringe holding 40 m. one can safely make 25 injections of No. 1, 50 of No. 2, and 300 of No. 3 without getting the maximum dose of cocain or eucain.

The scrotum, labia, arms, must be painted with glycerine previous to using ether spray. On mucous membranes use a crystal of cocain or acidium carbolic previous to insertion of needle to render this procedure painless. Technic must be modified to suit each case. The use of cocain hydrochlorate in the formulas given by Schleich has proven efficacious in every way. I have endeavored to follow his technic in its use. I recently used it on an eighteen year-old boy of a nervous temperament in an operation for two ingrowing toe nails. He objected to being put under ether and wanted to know if there was not another way. I informed him that there was and prepared the No. 2 (normal) solution, substituting eucain for cocain. After thoroughly cleansing the parts, I placed a rubber band on the toe to prevent bleeding, and sprayed the toe with ether to render the insertion of the needle painless. The first insertion was in a healthy tissue. I here injected about six to eight mimims of the solution, producing a wheal just under the skin. The next insertion was in the area of the first wheal. I continued this procedure until the entire area to be operated upon was infiltrated, after which the removal of the necessary tissue and the nail was absolutely painless. Ordinary antiseptic dressings were applied and healthy healing was brought about in a short time.

An Irate Female.—A female medical student who failed at a recent examination in London so effectually lost control of her inhibitory moral sense as to retaliate in the following ungrammatical convulsive outburst: "Very soon doctors will be drawn from we pure, noble-minded women, and you vile, drunken, filthy men expelled forever.—*Lancet.*

There is something nice about balance of trade. For instance, a farmer comes to the city loaded with hay and returns home loaded with rye.—*Tex. Cour. Rev. of Med.*

CURRENT LITERATURE CONDENSED.

Infantile Hematemesis and Melena.[1]

The vomiting and purging of blood is so seldom met with in children and infants that a case which came under my notice recently may be of interest. The baby in whom it occurred was healthy and full grown, and for nearly twelve hours after her birth, everything—including taking to the mother's breast—seemed to go well. About the end of that time, however, the mother first noticed the baby's lips and mouth to be blood-stained, but, although the same phenomenon showed itself several times later on in the evening, and was on one or two occasions accompanied with slight vomiting of a muco-sanguineous fluid, she took no particular notice of the matter, attributing it to the fact that one of her nipples tended to be sore. Throughout the following night nothing beyond a similar repetition of events occurred, except that the child had a passage of a very dark brown color, which on ordinary observation would have been taken as wholly consisting of meconium, but which on closer inspection proved to be a mixture of this and blood.

The first intimation I got that anything was wrong was on the following day, when a hurried message was sent to me. I was informed that after her morning bath and dressing the infant had vomited blood of a bright red color, and had passed stools of a deep blood-black appearance. I found the facts as stated by the stains on the clothing, etc., and the child immediately afterwards in my presence vomited blood, and the napkin was saturated with a bloody discharge, which poured out from the anus. The child by this was very anemic, and showed signs of impending death. I fully inquired into every particular which might throw light upon the subject, with a negative result. The mother's labor was not other than ordinary.

The treatment which I adopted with a view to the arrest of the hemorrhage was small doses of ergot, iron and gallic acid. These at first seemed to check it, but it soon broke out again, and between three and four hours after I was summoned to her the child died from exhaustion following persistent hematemesis and melena. No necropsy was held. The bleeding was not attended with any other sign of affection of the abdominal viscera. The mother and nurse did not recognize any danger earlier than when they sent for me; and as for the breasts, no trace of blood oozing or procurable from them could on examination be discovered.

[1] R. Hill Shaw, M.B., Dublin. In *British Medical Journal.*

Abortive Treatment of Quinsy.

The customary treatment of quinsy, or angina phlegmonosa, consists in waiting until the abscess is formed and then opening it with an incision through the soft palate. This waiting is not pleasant, and there are many cases where the patient suffers tortures, is unable to sleep, cannot eat or drink, and frequently his life is endangered. For some time I have been treating such cases, with very good results, in the following way: A probe, preferably of pure silver, bent to the proper angle, is inserted into each of the lacunæ as deep as it will go, and a certain amount of force is used pulling the tonsil in every direction and producing a slight hemorrhage, while the probe is turned in all directions, but more especially upwards, where the abscess always forms.

This treatment gives immediate relief to the patient, so that he is enabled to follow his usual avocations and to eat and sleep. It is repeated whenever the patient is in pain, and the result is that no abscess forms; the edema of the uvula and larynx disappears after the first application; the fever also leaves the patient and the attack is over within, at the latest, three days. I use the probe of pure silver because it is very flexible and can be disinfected in the flame; this is of importance in order not to infect the tonsils.

Follicular tonsillitis will also yield to this treatment. It is more beneficial if the probe is armed with some salicylic acid.

In discussion Dr. J. H. Bryan said: Local treatment is not sufficient for quinsy, because it is a general disease,

usually due to the uric acid diathesis, and the only way to treat it is by remedies directed to that disorder. I have found salicylate of soda the best thing. When the disease is seen very early, and where it is possible to get antiseptics into the deep lacunæ the inflammation will stop, but it is very rarely that we see patients before the suppurative process has begun.

Dr. C. W. Richardson said: In the first twenty-four hours it is not always possible to tell whether you are going to have a suppuration or simple follicular tonsillitis, or simply a parenchymatous inflammation of the tissues, which does not go on to suppuration. I have seen cases that were thought to have been aborted by local treatment, but I have seen the same treatment fail, so I am inclined to think that those aborted were clearly cases that did not go on to suppuration. I believe that quinsy is a constitutional disease, and that persons with the uric acid diathesis are more susceptible only because they are more susceptible to cold. It seems to me that Dr. Bermann's method is a very good one for the local treatment of follicular tonsillitis, but I cannot see how it can prove of service in a suppurative disease of the areolar tissue of the tonsil.

Dr. W. W. Johnston: When Dr. Richardson speaks of aborting suppurative inflammations I suppose he does not mean the cure of abscesses. Abortion of parenchymatous tonsillitis is not an abortion of suppurative tonsillitis, for it cannot be called this until pus has formed. Inflammation of the tonsil may become a parenchymatous inflammation, or it may or may not end in the formation of pus. Any treatment which can prevent a parenchymatous disease from becoming suppurative is an abortive treatment. Only experience will establish the results which Dr. Bermann claims for his treatment. What interests me in the plan of treatment is the bearing which it has on a theory, which has been advanced as to the cause of this inflammation—that rheumatism is due to a microörganism, and that this is the same microörganism which produces tonsillar inflammation. Dr. Wagner, of San Francisco, claims that by scraping into the tonsil, or cutting it, he has got the same microörganism as from the fluid obtained by tapping a rheumatic joint; which goes to show that there is some relation between tonsillar inflammation and rheumatism. I do not know whether any one has confirmed these observations of Wagner. The evidence of tonsillar inflammation being rheumatic is not by any means clear, and yet if you ask a body of medical men what is the appropriate treatment for tonsillitis they will say the same remedies as for rheumatism. And yet no one can say positively that it is rheumatic in its nature; the faith that is put in salicylate of soda seems to be empirical. It is the popular treatment of to-day, originally based on a theory for which there is no adequate proof, but now accepted on its own merits.

Some Parts that Youths have Played in History.

A curious inquirer has made research among the facts of history, and sets forth the following:

Jefferson, at thirty-three, drafted the Declaration of Independence.

General Sheridan was thirty-four at the close of the war.

Napoleon was Emperor of France at thirty-five.

Commodore Perry fought the battle of Lake Erie at twenty-eight, and died at thirty-four.

Nelson was forty at the battle of Aboukir.

Hamilton was thirty at the close of the War of the Revolution.

Fulton was thirty-eight when he launched the first steamboat.

John Hancock was thirty-eight when president of the Continental Congress.

Henry Clay, at thirty-seven, was United States Commissioner to negotiate the Treaty of Ghent.

William Pitt was Prime Minister at twenty-seven.

Robert Bruce, at forty, defeated the English at Bannockburn.

Daniel Webster, at thirty-six, was the leading lawyer in the United States.—*Annals of Hygiene.*

Doolan—Fitzgerald says he's descinded from some of the greatest houses in Ireland.

Mulcahy—Musha! So he did, many's a time—on a laddher!—*Dublin Gazette.*

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PHILADELPHIA, SATURDAY, DECEMBER 12, 1896.

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EDITORIAL.

SUSPENSIO UTERI.

It is claimed that one-half of the operations for the displacement of the uterus have been performed by one American surgeon. Fortunately, therefore, the operation has not become so popularized as to become of general adoption through the medical world. One man claims to have done a few short of one hundred operations and claims results to have been of the most satisfactory character. It is to be hoped that the claims of the men who practice this procedure, with all the associated facts as to conditions, will be carefully investigated before the adop-

tion of the operation becomes epidemic in form, as is the tendency in too many of our surgical procedures.

It does not seem rational to fix the uterus to the abdominal wall by surgical means to accomplish the cure of a condition of itself far less dangerous than that produced by the operation. The statistics showing the number of pregnancies following this operation certainly do not recommend it. The dangerous complications of obstructed bowel and delayed and disturbed labor must greatly overbalance any possible good that can accrue from it. We recall two cases within our recollection of obstruction of the bowel, resulting from this operation, one terminating in death, the other in recovery. In both of these cases the original operations were done by the same surgeon.

The fifty and more cases of pregnancy following eight hundred operations for ventral fixation will not convince the experienced practitioner who has had much to do with uterine displacements of the usefulness of this procedure. It is a very common thing to find a woman barren from displacement of the uterus, and it is almost as common to find the same woman returning, after several months of treatment by pessaries or otherwise, to report herself pregnant, and if a pessary had been used to have it removed. Uterine displacement involves great suffering and distress in some cases where the uterus and appendages are adherent, with the ovary under, behind and pressed upon by the uterus, and removal of the diseased appendage or appendages is sometimes required, yet the tying off of the appendage of one or both sides will hold the uterus in perfect position without the use of any fastening to the abdominal wall. This operation is almost so frequent in some of our medical centres as the legitimate removal of conditions that lead to the almost immediate destruction of the patient unless surgically relieved.

This operation offers so many excuses to the surgeon to multiply cases, to add to his statistics, and tempts the operator into a very questionable field of surgical procedure. When a man can report a number of cases of abdominal section for various conditions and of that number almost one-half for ventral fixation, his mortality should show very well beside the reports of those surgeons operating for the accidents of obstruction and other complications following this operation, and other dangerous conditions for which all busy surgeons are called upon to operate. Statistics are therefore worth but little unless we know the exact conditions present at the time of operation and the conditions for which the operation was done, whether done by the election of a man who thinks that suspending the uterus by a few sutures is a legitimate procedure, or by one who would only consent to subject his patient to such mutilation for conditions leading to the rapid destruction of life.

Unfortunately, surgery has its fads, and the poor patient often must, and only too frequently does, pay for them.

Abdominal surgery has done too much to relieve suffering women and prolong lives, and has too strong and too legitimate a claim to the high place it holds in the profession and in the confidence of the unfortunates in every community not to have some limit observed in surgical experimentation, especially with men not competent, either through scientific study and research or experience, to judge of the wisdom of any procedure. All our surgical procedures should be brought under the strongest light possible to bring to bear upon them. Each and every one should have the strongest fortification; in fact, be sustained by the strong logic of beneficial results.

CORRESPONDENCE.

REVIEW OF AN EDITORIAL ON ECTOPIC PREGNANCY.

EDITOR OF THE REPORTER:

The editorial in the November issue of the *American Gynecological* and *Obstetrical Journal* cannot fail to attract professional notice, not so much for the originality or novelty of the ideas advanced as for palpable error. The editorial borders upon that conservatism which has done so much to retard the progress of medical and surgical science. It is something of a sermon to the profession and possibly, as one of the congregation, we have no right to "jaw back at the preacher." He appeals to the Decalogue and discourses upon the sublime topic, human life, and in crying out at professional ignorance of the sublimity of life, almost places upon the souls of men a blasphemy which denies him his religion. With all due reverence for all that is sacred and best, we venture to state that little of the knowledge coeval with Moses is of practical value in modern medicine and surgery.

The article under discussion comes from one who by very virtue of his position and the wide circulation of the journal, is presumed to do much in forming and directing medical and surgical opinion. Gifted with great facilities of expression he speaks through his journal to our professional world and should represent faithfully our hopes and progress, reflecting that consensus of eminent authority which justifies and makes duties of certain of our surgical procedures.

It is difficult to consider the editor serious, yet we fail to discover a note of irony. In the following we find expressed in clear, distinct, easily understood language ideas which can only tend to produce skepticism where a strong faith is needed; create a form of social condemnation; and bring reproach upon a medical procedure which has done so much to relieve the sufferings of unfortunate women and to save so many lives. He says: "For a great many years ectopic pregnancy has been known but the knowledge was almost theoretical; and was of no practical value. Modern surgical knowledge and operative facility has solved half the problem; it saves one human being by *killing another* (all italics mine); it rescues the mother but only by the *deliberate destruction of the child.* We have, therefore, from an *ethical and moral point of view, made no direct advance in the treatment of this condition,* for what we know now and what is done surgically now were as well known and could have been as easily performed by our ancestors had they the benefit of asepsis. In future generations our present methods of treatment will stand as *an awful reproach* to the profession, that for so many years we complacently applied the principles of *pure expediency* to one of the fundamental laws of human society—a law explicitly commanded of God and universally acknowledged to be based upon abstract justice—'Thou shalt not kill.' For it cannot be denied that the fetus is as much a distinct and independent human entity as is the child at the breast or, for that matter, *the mother herself;* and, finally, that it has as much inherent and inalienable right to its own life as has the mother to hers or the surgeon, who *kills it,* to his own."

There is much top-lofty sentiment and very little logic in the above; nothing at all sustained by modern experience, and the results in the cases under discussion. We have long had very many wordy discussions of the ethics of operative procedures. The discussions have generally originated with and been carried on by men with very limited surgical experience. The one thing that justifies any procedure is its life-saving service.

In ectopic pregnancy we have more than "solved half the problem." With our earlier practitioners it was not lack of the "benefit of asepsis" that held their hands; they doubted their power to diagnose the condition in these cases, yet more than ability to surgically deal with it when diagnosed. Our "direct

advances in the treatment of this condition" have removed these doubts and sense of inability; we know these cases can be successfully dealt with surgically. Adaptability or aptitude for this special work is not here in question. Where there is failure to correctly diagnose conditions (after rupture) there is want of experience and training, and where there is failure to operate there is a want of surgical courage or conscience or both. Result:—In these cases the weight of surgical opinion is against "waiting with folded hands until rupture has assured the death of the fetus by natural means." The master in this as in other gynecologic procedures, Mr. Lawson Tait, says: "I have been enabled to diagnose (this after rupture) eight out of ten cases, and in the remainder it was best not to wait for a diagnosis but to act at once."

The sacrifice of one life to save another seems to be the ethical objection against surgical interference. Aside from the value, the sacredness, of the life of the mother there are facts associated with this most fatal of accidents, facts sustained by the statistics of very many foreign and American surgeons that point to the moral obligation for operative proceedings. The cases of Dr. Joseph Price number more than one hundred and thirty, my own forty, a total of one hundred and seventy. In all this number only three children were found alive, all having perished previous to the patients having been seen by the surgeons.

In the cases of the three living children, two of the mothers perished of hemorrhage soon after operation, one on the ninth day, the other earlier. In the one hundred and seventy or more cases there were nine deaths, all from hemorrhage.

The case of the living mother and child was my own. This case was operated on for extra-uterine pregnancy at full term, and was reported the following year (1892) to the Pennsylvania State Medical Society. The case is reported by Gregg Smith as the only case in America where both mother and child survived the operation. Smith *generously* credits the operation to one Eastman of Philadelphia, while there is no man of the name belonging to the profession living in the city. His statistics would have been more reliable if he had obtained them from some Philadelphian capable of telling the truth.

My having had this one experience of saving both mother and child has not changed my opinion that all cases of extra-uterine pregnancy should be surgically dealt with at the very earliest moment that a diagnosis can be reached, when symptoms are even no more prominently marked than to justify a presumptive diagnosis. The issue being one of human life,—that life a mother's—the head of a home,—it is failure in professional duty, if not crime, to delay. I have no desire to operate in another case at term, to witness the awful agony of the mother and to watch the slender thread by which life is held through a period of thirty-five consecutive days with seeming little possibility of final recovery.

I am satisfied that no experienced surgeon, one familiar with the determining symptoms in these cases and who has had a single experience in a case gone to or near term, will ever consent that one be permitted to go to term. They go to term simply because they are not recognized. Figures would fail to reckon the mortality in the unrecognized cases.

In "future generations our present methods of treatment" will not stand so much as "an awful reproach," as our failure to practice the faultless lessons our advanced science and art teach with all the authority of demonstrated truths. All experience in these cases, the combined experience of surgeons of skill and acknowledged authority, go to demonstrate that the fetus is found dead in ninety-nine in every one hundred cases operated upon, and only very rarely found alive in those cases culpably permitted to drift along to the great peril of the life of the mother, more frequently finally fatal than otherwise. The surgical procedure, therefore, in these cases is no more taking the life of the child, or feticide, than an autopsy is murder. There is no question but that the surgeon, even the most skillful, in exceptional cases, shortens the life of the patient in his honest endeavor to remove conditions that are destroying life. Where that effort fails there is no doubt

life is shortened by the operation. Patients accept the risk in the hope of obtaining relief from intolerable conditions and having life prolonged.

The editor employs the expression "sentimental sophistry." The expression very aptly applies to the following quotation from the editorial:

"We cannot acquiesce calmly in legalized feticide and feel that our duty is accomplished when we have merely learned the simple expedient of saving the mother's life by the direct destruction of that of another human being. We will go further and say that we consider that in this disease the physician has two patients and that his obligation to the unborn child is as great as to the mother. The fact that the fetus is a silent and helpless victim can in no way lessen the physician's obligation toward it." This is sentiment run mad. The X rays are not needed to discover the absurdity of such teaching.

Fortunately we do not meet with many physicians and surgeons who do not appreciate their obligations in these cases, the grave character of their duty. They have conscience in the matter and appreciate to the fullest the sacredness of human life. They appreciate that it is their duty to save the life possible to save.

MORDECAI PRICE, M. D.

PHILADELPHIA, December 3, 1896.

ABSTRACTS.

THE LEGAL VALUE OF DYING DECLARATIONS.*

Dying declarations, as defined by the American and English cyclopedias, are statements of homicide made by the victim under the solemn belief of impending death. The effect of such belief is regarded as equivalent to the sanctity of an oath. Declarations so made are substitutes for sworn testimony, and they must be such narrative statements as a witness might give on the stand if living.

The importance to the physician or medical examiner of a knowledge of the subject of dying declarations was impressed upon my mind by a case of death from criminal abortion which occurred in my district about a year and a half ago. In this case the accused was brought to trial and convicted. During the trial dying statements of two different persons were offered in evidence. In one case this evidence, if admitted, would have been favorable to the accused; in the other, to the prosecution.

I will narrate as briefly as possible the case to which I refer, and from this illustration, try to define what constitutes a dying declaration, what circumstances are necessary to make it valid, and how slight an error or oversight may throw it all out as inadmissible.

On the evening of November 20, 1894, a physician in Woburn telephoned me that he was in attendance upon an unmarried girl upon whom he had reason to suppose an abortion had been done, and that she would probably die. She did die the next night. I viewed the body the following morning, November 22, inquired into the circumstances of the sickness and death, and made an autopsy at the undertaker's the same afternoon. From the physician in attendance and from the family of the sister at whose house she died, I obtained the following facts:

Petrina Matson, single, domestic, aged twenty-one years, born in Denmark, discovered in September, 1894, that she was pregnant. She was taken by her lover to some place in Boston, where an "operation" was performed October 24, 1894. She was then sent to the house of a "nurse" for care. Her sister and her relatives, missing her, made diligent search, and after ten days found her at the house of the so-called "nurse." They brought her home to her sister's house in Montvale, Woburn. Dr. Chalmers was called to attend her.

*Daniel March, Jr., M.D., in Boston *Medical and Surgical Journal.*

He found her with symptoms of septic peritonitis — abdominal pain; fever; thin, mucous diarrhea, and a foul, dark, bloody discharge from the vagina. At times she was seemingly a little better, but gradually became worse until, twenty-eight days after the operation, she died.

She had been very reticent during her last illness; she would make no statement to the physician and did not think she was going to die. She had, however, confided to her sister something about the operation.

The autopsy showed the body of an emaciated girl, abdomen rather sunken, vagina large enough to admit two fingers, a very foul discharge from the vagina; the uterus of normal size, the neck of the uterus on one side lacerated its entire length as if rudely torn by some instrument, catarrhal inflammation of the mucous membrane of the entire intestinal tract.

The history and post-mortem examination justified a report of "death from septic fever, the result of criminal abortion." "Dr." Henry E. Bishop, *alias* "Dr." Herman, *alias* "Dr." Bailey, was arrested. After tedious preliminary hearings, the grand jury promptly indicted Bishop for criminal malpractice in causing the death of Petrina Matson, and in another indictment charged Bishop also with another similar offence in the case of a colored girl, Florence Adley, who died in the City Hospital, Boston.

At the hearing of the latter case, the house officer who had charge of the patient at the city Hospital, was called to testify; and he said that the girl, being very ill and feeling that she could not recover, stated to him the facts about the operation, and that it was done by Bishop. Afterwards, however, she felt a little better, and said to some friends, or persons at her bedside, that "she hoped to get well." This expression was sufficient to entirely negative her first statement as a dying declaration, and the whole was ruled out as inadmissible.

In the Matson case, the witnesses were the young man who had been arrested as accessory, who took her to Bishop's office and paid the fee, the physician who attended at her home, the medical examiner, and the girl's sister. The defence was evidently very anxious to put this latter witness on the stand. She had talked with her sister during her last illness; she had heard the whole story; and this she was prepared to relate. But the judge questioned her so closely in regard to the circumstances that the witness was obliged to admit that her sister did not know that she was so seriously ill, and did not know that she was going to die. Therefore, this evidence was merely hearsay and not a dying declaration; and the witness was not permitted to testify in regard to any conversation, whatever it may have been.

The jury brought in a verdict of guilty in the Matson case. Some months later, January 7, 1896, the exceptions having been overruled by the Supreme Court, Bishop was sentenced to the State Prison under the Indeterminate Sentence Act of 1895. The minimum term of his sentence was fixed at seven years; in case the court has any power to sentence definitely, his term was made ten years.

The court said that it could not help feeling that a man who attempted to perform operations of the kind that defendant attempted, ought to have the skill commensurate with the task, and that the business as carried on by the defendant, who, as appears was once a butcher and then a policeman before he practiced such operations, was nothing less than pure butchery. Accordingly, his sentence was made severe.

It is important for the physician in attendance upon a woman likely to die from the results of a criminal abortion to have clearly in mind his legal position and responsibilities. I quote a few of the acknowledged principles which have a bearing upon such cases. Dying declarations are accepted in law without being sworn to. It is naturally presumed that all statements made at such a solemn crisis must be sincere, believed at heart to be true by the dying person, even if subsequently shown not to be so.

The attending physician under such circumstances having expressed the opinion that the patient is dying and in sound mind, a magistrate should be summoned to take down the statements

that the dying person may wish to make. Should it not be possible to obtain the services of the magistrate, then the attending physician can take down the dying declarations. The physician should, however, limit himself to writing down the exact words of the dying person, without offering any interpretation whatever. The statements should be read over to the dying person, and, if possible, her signature obtained.

The declarations must be made, not simply *in articulo mortis*, but under the sense of impending death, without expectation or hope of recovery. They are admissible even though others may not have thought the person would die.

The declarations may be signs or other appropriate modes of communication. It is not necessary that the examination of the dying person should be made after the manner of interrogating a witness in the case, although any departure from that mode may affect the value and credibility of the declarations. It is no objection to their admissibility that they were made in answer to leading questions, or were obtained by pressing and urgent solicitation, but the declarations must be made under a sense of impending dissolution. It does not matter that death failed to ensue until a considerable time after such declarations were made.

Declarations of a deceased person are admissible only in reference to those subjects to which she would have been competent to testify if sworn in the case. They must, therefore, in general, speak to facts only and not to mere matter of opinion, and they must be confined to what is relevant to the issue.

The circumstances under which the declarations were made are to be shown to the judge, it being his province and not that of the jury to determine whether they are admissible.

If the deposition of the deceased has been taken under any of the statutes on that subject, and is inadmissible as such for want of compliance with some of the legal formalities, it seems that it may still be treated as a dying declaration if made *in extremis*.

THE DIAGNOSIS OF TUBERCULOSIS FROM THE MORPHOLOGY OF THE BLOOD*.

It is well known that if the diagnosis of tuberculosis be delayed until it is confirmed by the discovery of tubercle bacilli in the sputum, the most important period has been neglected. When bacilli are found, the patient is already in the active state of the disease, and, in many cases, it is then too late to check it. Therefore, the first step in the prevention of tuberculosis should be an early diagnosis. If this can be done before the active state begins, or at its beginning, many may avoid or at least delay the destructive results which otherwise would soon follow.

Authorities quite agree that in tuberculosis there exists a shorter or longer latent or pretuberculous state. They also agree that the leucocytes of the blood are tissue-formers. During this so-called latent period the body is undergoing retrograde changes. The body tissues are being constructed of the leucocytes of the blood. Hence it occurred to me recently that, before the disintegration of the gross tissues of the body begins, the blood would show distinct and characteristic signs of a similar nature; and, if so, that a study of these appearances could be made a valuable means of diagnosis in this disease. With this in view I selected a few patients with pronounced tuberculosis, and carefully studied a specimen of blood from each. With each specimen I used absolutely the same technic with reference to taking the films, fixing, staining, and mounting. Afterward cases with similar blood characteristics were grouped together, and to my surprise I found a remarkable similarity in the histories and clinical symptoms. Hence these studies have convinced me that in tuberculosis the condition of the individual can be interpreted from the appearances of the leucocytes of his blood.

Whether the tuberculous condition be inherited or acquired, we find in such persons a tendency to a more or less ex-

*A. M. Holmes, A.M., M.D., Denver, Col., lecturer on Hematology in University of Colorado; Hematologist to St. Joseph's Hospital; in the *Medical Record*.

tensive tissue disintegration. In tuberculous blood I have found cell disintegration abundant, and especially so in young and middle-aged leucocytes.

Hence the fundamental principle upon which this thesis is constructed is the hypothesis that every individual has a biologic prototype in the leucocytes of his own blood. What is true of the larger organism is true of the smaller. What is true of man is true of the leucocytes of which man is constructed. And conversely, what is true of the cell is true of the individual. Hence, upon this hypothesis I shall attempt to show a relation of diagnostic value between certain morphologic appearances in the leucocytes of the blood and certain conditions in the patient.

It is the opinion held by the majority of observers, Uskow, Gullard, Ehrlich, and others, that the various forms of leucocytes are mere stages or transitional forms in the life history of the cell. The characteristics which point to the growth of leucocytes, and from which their ages may be approximately ascertained, are based upon first a differentiation or division of the nucleus; second, the appearance of granules in the cell protoplasm.

As a young leucocyte develops, the nucleus attempts to divide. It first changes from the spheroidal or oval form by extending a portion of itself in various directions. The forms seen in this stage are characterized as "transitional" forms. As the cell continues to develop, many of these nuclei completely divide. The cell then contains two or more nuclei and is called a polynuclear leucocyte.

A very young leucocyte possesses very little cell body, being almost all nucleus. But as it develops, the cell body increases in size. The cell body in young cells is non-granular, but is either transparent or basophile. As it develops we often observe a tendency to granulation, the granules at first being transparent or faintly basophile. In health they develop in the cell protoplasm simutaneously with the characteristic transitional changes in the nucleus. As the nucleus reaches the transitional or polynuclear form, the granules become more numerous and change from transparent or basophile to oxyphile. Hence, in health oxyphile granules are never seen except in transitional or polynuclear leucocytes or in mature cells. When they are observed in lymphocytes, or young cells, it indicates a prematurely developed cell protoplasm, or a nucleus endowed with low vitality and unable to divide.

Again, when leucocytes reach maturity and begin to decay, the granules of the cell protoplasm become less oxyphile and often faintly basophile. Hence, when phagocytes or mature leucocytes are observed with granules which are only slightly oxyphile, or with a basophile tint, we have a cell that is undergoing disintegration—a cell that is returning to its second childhood. Its granules were first basophile, then became oxyphile, and if the cell lives long enough they again become basophile.

But all cells do not pass through each of these stages. As a child with a frail organism rarely reaches maturity, so frail leucocytes often die in their infancy. Leucocytes come from pre-existing leucocytes, and here, as well as with the more specialized sperm and germ, the characters of the parent are handed down to the offspring.

The histology of the leucocytes, studied microchemically, shows that they consist of four tissues: chromatin and achromatin, tissues of the nucleus; spongioplasm and hyaloplasm, tissues of the cell body. Each of these tissues gives a specific reaction to stains, and they react differently in health and in disease. The spongioplasm is a network of delicate protoplasm in the cell body, which surrounds and encloses the globules of hyaloplasm, in the same manner that the skin, mucous membrane, and layers of fascia surround and enclose the larger animal organism and its anatomic parts. The chromatin is also a network of extremely delicate nuclear protoplasm, which encloses and protects its more delicate tissue, the achromatin, in the same manner that the external membranes of the brain and nerves surround and protect the delicate tissues within them.

Von Recklinghausen and Cohnheim demonstrated that the leucocytes possess distinct and independent functions. They receive food, grow, migrate, construct, generate, and eliminate. Hence we find in them functions exactly analogous to those in the larger animal.

In gross pathology, when the tissues

are changed in their morphologic appearances their functions are altered. Therefore, when the cell tissues are changed in their appearances and reactions to stains, their functions are also changed.

In tuberculosis of the individual we find a rupture, or evidence of beginning rupture, of the continuity of the enclosing membrane, skin or mucous membrane, according to whether it is surgical or pulmonary tuberculosis. When the membrane is ruptured we find a discharge of broken down or disintegrating tissue. In tuberculosis of leucocytes an identical process is observed. There is a rupture of or an attempt to rupture the spongioplasm. When this is ruptured a portion of the cell is observed passing out, or it has already passed out, leaving a depression in the cell corresponding to the amount of tissue lost.

When the spongioplasm has not yet broken the cell is distorted, with irregular contour and a portion of the cell protoplasm protruding at various points. Hence, the law that brings about disintegration in the tuberculous patient brings about the same process at an earlier date in the tuberculous leucocyte. The cells show all degrees of disintegration. The blood serum is loaded with débris from these disintegrating cells. With marked disintegration of lymphocytes, or the young cells, we can safely predict adult cells of weakened vitality. Consequently, the phagocytes or tissue formers will be feeble and inactive. Therefore, with marked disintegration in the leucocytes, it is with absolute certainty that we can predict a similar condition in the larger organism. When this condition exists, bacilli find a congenial culture medium in which to lodge and develop, with very little resistance on the part of the phagocytes.

Perhaps the most important analogy is between the leucocytes of an individual and the individuals of humanity. Each particular class or type in the normal state represents a definite percentage of the total number. In other words, each leucocyte, whether infant, middle-aged, or adult cell, bears such analogous relation to the totality of cell aggregation which constitutes the individual as each individual bears to the totality of individual aggregation which constitutes the more highly complex organism—humanity.

The statistics of any people will show that there is a fairly uniform percentage of the total population for childhood, for middle age, and for adult life. When these percentages are materially changed, we have reason to suspect something wrong in the vital economy. Tne same law holds good in the leucocytes of blood. The consensus of opinion among the hematologists is quite uniform as to the

Percentages of Leucocytes in Normal Blood.—Neudorfer's classification is approximately as follows:* Small lymphocytes, twenty-six per cent.; large lymphocytes, eight per cent.; phagocytes, sixty-five per cent.; eosinophile leucocytes, one per cent. In nearly all pathologic conditions there is more or less variation from these percentages. Hence, when we find a marked variation from the above percentages, we may be quite certain that we have a pathologic condition somewhere in the organism. The following table prepared from the cases studied will show a variation from the normal percentages of considerable diagnostic significance. And, furthermore, a study of the table will also show comparatively uniform percentages for each type of the disease.

I am indebted to many of the physicians of Denver for numerous cases furnished from their private practice, and I wish here to express my gratitude for their valuable aid in this laborious study. The thirty-five presented represent, so nearly as possible, every stage in the tuberculous condition—those in various stages of the active disease, those who have inherited a strong predisposition, and those in various stages of convalescence.

Summary of Cases.—Incipient pulmonary tuberculosis, 1 to 7; incipient laryngeal tuberculosis, 8 and 9; convalescent pulmonary tuberculosis, 10 to 14; advanced pulmonary tuberculosis, 15 and 21; fatal cases of pulmonary tuberculosis, 22 and 23; fatal cases of tuberculous meningitis, 24; last stage of pulmonary tuberculosis, 25; tuberculous periostitis, 26; tuberculous necrosis of spinal vertebra, 27; tuberculous hip-joint, 28; tuberculous knee-joint, 29; tuberculous adenitis, 30; pretuberculous and non-tuberculous, 31 to 35.

*To estimate the percentage of each variety of leucocytes, five hundred or more cells should be counted and an average taken.

TABLE I.

No.	Name	Age	Percentage of Small Lymphocytes.	Percentage of Large Lymphocytes.	Percent. of Phagocytes or Neutrophiles.	Percentage of Eosinophile Leucocytes.	Percentage of Myelocytes.	Condition ascertained from a study of the patient.	Condition ascertained from a study of the blood.
1	Mr. H...	18	7	17	73	2	⅛	Incipient pulmonary tuberculosis; little sputum; few bacilli.	Tuberculous condition marked. Recuperative power good.
2	Miss X.	23	13	14	71	2	.....	Incipient pulmonary tuberculosis; very little sputum.	Tuberculous condition marked. Fair recuperative power.
3	Mr. H...	26	16	9	74	1	.....	Incipient pulmonary tuberculosis; sputum and bacilli.	Marked tuberculous condition. Strong recuperative power.
4	Miss S...	...	11	11	77	1	.....	Incipient pulmonary tuberculosis. Beginning convalescence.	Marked tuberculous condition. Fair recuperative power.
5	Miss N.	38	13	12	74	1	.....	Strong tuberculous predisposition. Had tuberculosis and recovered. Now threatened with relapse.	Tuberculous condition marked. Strong recuperative power.
6	Mr. B...	58	9 15	23 12	66 69	2 4	1st count. 2d count two weeks later.	Incipient pulmonary tuberculosis; severe cough; little sputum; no bacilli.	Tuberculous condition well marked. Two weeks later much improved.
7	Mr. C...	27	12	12	74	2	.....	Incipient pulmonary tuberculosis. Beginning convalescence.	Tuberculous condition marked. Strong recuperative power.
8	Mr. J...	25	12	12	74	2	.....	Tuberculous laryngitis; little sputum; bacilli. Improving slightly.	Tuberculous condition marked. Slight recuperative power.
9	Mr. M...	56	16	13	70	1	.....	Tuberculous laryngitis and incipient pulmonary tuberculosis; very little sputum; bacilli.	Marked tuberculous condition. Moderate recuperative power.
10	Mrs. F..	25	26	20	51	3	.....	Incipient pulmonary tuberculosis; no sputum; very little cough. Convalescent.	Tuberculous condition well marked. Strong effort to recuperate.
11	Mr. U...	32	23	16	59	2	.....	Pulmonary tuberculosis. Convalescing. No cough, no sputum.	Tuberculous condition moderate. Fair recuperative power.
12	Mr. M...	32	31	6	63	⅛	.....	Pulmonary tuberculosis. Convalescent. No cough; no sputum.	Tuberculous condition slightly marked. Strong recuperative power.
13	Mr. X...	..	37	8	53	2	.....	Pulmonary tuberculosis. Convalescent.	Tuberculous condition very slight. Strong recuperative power.
14	Mr. D...	...	32	13	53	2	.....	Pulmonary tuberculosis. Convalescent.	Tuberculous condition marked. Fair recuperative power.
15	Mr. E...	23	8	8	81	3½	.....	Advanced pulmonary tuberculosis; abundant sputum; cavity; bacilli.	Marked tuberculous condition. Little recuperative power.
16	Mr. M...	32	7	5	87	1	.....	Advanced pulmonary tuberculosis; large cavity; abundant sputum; bacilli.	Marked tuberculous condition. No recuperative power. Granules with basophile tint.
17	Mr. H...	55	7	16	74	3	.....	Advanced pulmonary and laryngeal tuberculosis of long standing. Slightly better.	Tuberculous condition marked. Slight recuperative power.
18	Mr. X...	38	8	10	81	1	.....	Advanced pulmonary tuberculosis; abundant sputum; bacilli.	Marked tuberculous condition. Slight recuperative power.
19	Mr. C...	28	8	10	80	1	1	Advanced pulmonary tuberculosis; abundant sputum; bacilli.	Marked tuberculous condition. Slight recuperative power.
20	Mr. L...	24	10	8	80	2	.....	Advanced pulmonary tuberculosis; abundant sputum; bacilli.	Marked tuberculous condition. Fair recuperative power.
21	Mr. H...	30	9	9	82	0	.....	Advanced pulmonary tuberculosis; abundant sputum; bacilli.	Marked tuberculous condition. Slight recuperative power.
22	Mr. T...	22	5	6	89	0	.....	Last stage, pulmonary tuberculosis. Died two days after taking blood films.	Marked tuberculous condition. No recuperative power. Granules with basophile tint.
23	Mr. E...	21	6	12	81	⅓	⅓	Advanced pulmonary tuberculosis. Died one month after taking blood films.	Marked tuberculous condition. No recuperative power.
24	Miss C...	16	9	17	73	0	1	Tuberculous meningitis. Died soon after taking blood films.	Marked tuberculous condition. No recuperative power. Absence of eosinophile cells; granules basophile; myelocytes.
25	Mr. B...	58	9	11	80	⅓	.....	Advanced pulmonary tuberculosis; purulent sputum; bacilli. Last stage.	Tuberculous condition well marked. Very little recuperative power. Granules slightly basophile.
26	Mr. S...	25	35	11	52	2	.....	Tuberculous periostitis. Amputation. Recovery. Blood examination five weeks after amputation.	Slight tuberculous condition. Strong recuperative power.
27	Mr. R...	16	7	12	80	⅓	⅓	Tuberculous abscess of spine with necrosis of vertebra; constant suppuration.	Marked tuberculous condition. Slight recuperative power.
28	Mr. H...	...	23	15	60	2	.....	Tuberculous hip-joint disease. Improvement slow.	Marked tuberculous condition. Slight recuperative power.
29	Mr. B...	58	21	11	59	9	.....	Tuberculous knee-joint; no suppuration.	Marked tuberculous condition. Bone probably involved.
30	Miss M.	22	9	13	77	0	1	Tuberculous adenitis of cervical glands. Severe form.	Tuberculous condition well marked. Feeble recuperative power.
31	Mr. X...	25	25	13	57	5	.....	Strong tuberculous history. Subject in perfect health.	Tuberculous condition slightly marked. Very strong recuperative power.
32	Mrs. X..	28	22	11	65	2⅔	⅓	Strong tuberculous history. Marked tuberculous predisposition.	Marked tuberculous condition. Strong recuperative power.
33	Mr. S....	58	8	21	70	1	.....	Tumor in left side. Diagnosis not made.	Tuberculous condition. Strong recuperative power.
34	Mr. H...	41	12	13	74	1⅓	.....	Strong tuberculous predisposition. Not yet broken down.	Tuberculous condition marked. Strong recuperative power.
35	Miss L..	24	21	6	70	3	.....	Malarious anemia. No tuberculous history.	Tuberculous condition not present.

Of these thirty-five cases six were test cases: 1, 3, 5, 32, 33 and 35. In each of these the blood was examined and diagnosis made without any knowledge of the history or physical condition. These six cases are classified as follows:

Incipient pulmonary tuberculosis, 1, 3, and 5.

Pretuberculous, not yet having reached the active stage of the disease, 32 and 33.

Non-tuberculous, 35.

The diagnosis made from the blood was in each of these cases confirmed by the attending physician.

It will be observed that there is no single characteristic in tuberculous blood which, if once learned, will enable us to diagnose the disease. We may have, and generally do have, except in well-advanced cases, three conditions of the cells existing at the same time and found in the same specimen: cells in (*a*) the normal condition, (*b*) beginning disintegration, and (*c*) advanced disintegration. It must be remembered also that there is no distinct dividing line between them. They blend insensibly into each other. Experience alone will enable us to educate the eye to distinguish these varieties.

In the study of tuberculous blood we should not only ascertain the percentage of each type of leucocyte, but also classify each type according to the

Degrees of Disintegration.—Beginning disintegration is characterized by a rupture in the contour of the cell, with globules of hyaloplasm passing out, leaving a depression in the cell corresponding to the amount of tissue lost—cell contour partly destroyed. Complete disintegration is characterized by a complete breaking up of the cell into small masses, and these scattering—cell contour entirely destroyed.

Many leucocytes in tuberculous blood do not show evidence of either of these forms of disintegration, but possess characteristics which a study of the foregoing cases has caused me to interpret as meaning lowered vitality, weakened functions.

The characteristics of diminished recuperative power are: (*a*) poorly stained or transparent nuclei; (*b*) granules of phagocytes diminished in number, poorly stained, and scattering; and (*c*) a decrease in number or a marked disintegration of the eosinophile cells. In many cases these characteristics predominate, while in others they are present in only a small percentage of the leucocytes.

Although the eosinophile cell continues to be enshrouded with much mystery, the recent researches of Kanthack and Hardy, of Cambridge, have undoubtedly given us much light upon the subject. They claim that the eosinophile cells are the advance guards of the phagocytes. The eosinophile cells first surround the bacilli and throw off some of their granules, or secrete a substance which renders the bacilli inactive, and while they are in this state the phagocytes surround and devour them. Therefore, with this interpretation of their function, in any germ disease where there is a decrease in the number of eosinophile cells, or a marked disintegration going on in them, the recuperative power of the organism is greatly diminished. Hence a study of tuberculous blood should reveal two important points: first, the degree of the tuberculous condition; second, the degree of the recuperative power.

Although the first of these is important, yet we must grant that it is equally important both to the patient and to the physician if we can ascertain the amount of recuperative power possessed by the patient, for upon this depends the probable chances of recovery or ability to combat the disease. If our fundamental hypothesis be correct; if the individual has a true prototype in his leucocytes; if the condition of the one can be ascertained from the appearance of the other; if the leucocytes are tissue formers; if it is true that as are the leucocytes so is the individual, then the real source of the recuperative power should be sought for in the leucocytes.

After a careful study and comparison of the blood appearances in all varieties of tuberculosis, I have observed that the nearer the blood characteristics approach the following, the greater is the

Contraindication of Tuberculosis.—We may see normal or approximately normal percentages of all varieties of leucocytes; absence of giant lymphocytes; absence of myelocytes; very little cell disintegration; very little débris from

disintegrating leucocytes; well-stained nuclei; phagocytes with cell-body clearly defined and granules rich in number and well stained; uniformity in size and appearance of the phagocytes.

While, on the other hand, the following are the characteristics of tuberculous blood, which vary according to the severity of the case. Marked deviation from the normal percentages of all varieties of leucocytes. Great decrease in percentage of small lymphocytes. Great increase in percentage of phagocytes. Usually, a marked increase in percentage of large lymphocytes. Many giant lymphocytes with irregular contour and protruding globules of hyaloplasm. Eosinophile cells absent or few in number only in severest cases. Myelocytes occasionally present. Marked cell disintegration. Many groups of débris from disintegrating leucocytes. Phagocytes with indistinct cell contour, and granules few in number, poorly stained, and scattering. Marked irregularity in size and appearance of phagocytes, dwarf phagocytes as small as lymphocytes, giant phagocytes double the usual size with five or more nuclei. Often a clear, narrow, and sharply defined ring separating the nucleus from the cell body in small and large lymphocytes. Phagocytes with granules taking a basophile tint, evidence of approaching dissolution. Grouping together of a large number of phagocytes observed before dissolution. Very little disintegration in red cells.

From a review of blood appearances in the foregoing cases, I have made the following deductions: First, that the degree of the tuberculous condition can be estimated by (*a*) the amount of deviation from the normal percentage of each variety of cells; and by (*b*) the amount of cell disintegration in each variety. Second, that the degree of the recuperative power is estimated by (*a*) the staining power of the nuclei; (*b*) the percentage of leucocytes with no evidence of disintegration; (*c*) the abundance of well-stained granules of the phagocytes; and (*d*) the abundance of eosinophile cells rich in granules.

The following tables will show quite plainly the peculiar percentage variation for small lymphocyte and phagocytes in the various stages of the disease.

TABLE II.
PRETUBERCULOUS CASES.

	31.	32.	33.	34.	Normal Percentages.
Percentages of small lymphocytes	25	22	8	12	26
Percentage of phagocytes	57	65	70	65	65

In pretuberculous cases, those which have not yet developed an active lesion, the percentage of small lymphocytes is normal or subnormal; and simultaneously, with the decrease in the percentage of small lymphocytes, there is an increased percentage of phagocytes.

TABLE III.
CONVALESCENT CASES.

	10.	11.	12.	13.	14.	26.	28.	Normal Percentages.
Percentage of small lymphocytes	26	23	31	37	32	35	23	26
Percentage of phagocytes	51	59	63	53	53	52	60	65

In convalescent tuberculosis the percentage of small lymphocytes is approximately normal or above normal; and simultaneously with the increase there is a decreased percentage of phagocytes.

TABLE IV.
SHOWING RANGE OF PERCENTAGES FOR PRETUBERCULOUS AND CONVALESCENT STAGES.

	Percentage of Small Lymphocytes.	Percentage of Phagocytes.
Normal state	26	65
Pretuberculous condition	8 to 25	57 to 74
Convalescent tuberculosis	23 to 37	51 to 63

TABLE V.
INCIPIENT CASES.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	Normal Percentages.
Percentage of small lymphocytes	7	13	16	11	13	9	12	12	16	26
Percent. of phago'yt's.	73	71	74	77	74	66	74	74	70	65

TABLE VI.
ADVANCED CASES.

	15.	16.	17.	18.	19.	20.	21.	27.	30.	Normal Percentages.
Percentage of small lymphocytes	8	7	7	8	8	10	9	7	9	26
Percentage of phagocytes	81	87	74	81	80	80	82	80	77	65

TABLE VII.
CASES IN LAST STAGE.

	22.	23.	*24.	25.	Normal Percentages.
Percentage of small lymphocytes	5	6	9	9	26
Percentage of phagocytes	89	81	73	80	65

* Tuberculous meningitis an exception. Percentage of phagocytes lower

TABLE VIII.
SHOWING RANGE OF PERCENTAGES FOR THE ACTIVE STAGES OF THE DISEASE.

	Percentage of Small lymphocytes.	Percentage of phagocytes.
Normal state	26	65
Incipient tuberculosis	7 to 16	66 to 77
Advanced tuberculosis	7 to 10	74 to 87
Last stage of tuberculosis	5 to 9	80 to 89

From the tables we make the following important deductions: First, as the tuberculous condition becomes more marked and the gravity of the case increases, the percentage of small lymphocytes decreases and the percentage of phagocytes increases.

Second. As the tuberculous condition becomes less marked and the convalescence increases, the percentage of small lymphocytes increases and the percentage of phagocytes decreases.

Many other deductions might be made from the tables with reference to the physical condition of the patients. For example, in all cases in which the blood shows the usual tuberculous characteristics, together with an increase in the phagocytes to 80 per cent. or over, it is quite safe to diagnose advanced pulmonary tuberculosis with cavity, profuse expectoration and abundant bacilli; or if surgical tuberculosis, an abscess with more or less discharge of pus.

I do not wish to be understood as saying that all of the appearances that I have described are necessarily present in each case of tuberculosis. Neither do I wish to say that many of them are not found in other diseases. But I do claim that a peculiar combination of blood appearances is characteristic of this disease, to the extent that they will enable us to make a diagnosis at an earlier date than by any other means that we now possess. It is quite probable that the near future will justify a stronger statement, that from the blood condition we will not only be able to diagnose tuberculosis, but that in many cases it will enable us to distinguish the various stages of the disease, and hence will be a valuable means of following the course of the disease under various methods of treatment.

In conclusion I will review this study with the following summary: That the diagnosis of tuberculosis, from the morphologic appearance of the blood, rests upon the hypothesis that each individual has a biologic prototype in the leucocytes of his own blood. That leucocytes are independent organisms with functions analogous to those of the larger organism. That they pass through stages of growth and decay. That disintegration of leucocytes may occur at any age. That the leucocytes are tissue formers. That, as are the leucocytes, so is the individual. That tuberculosis is a disease characterized by tissue disintegration. That in tuberculous blood there is abundant cell disintegration, premature development, premature decay, and more or less deviation from the normal percentages of the various types of cells. That if there is marked disintegration in the leucocytes, it is with absolute certainty that we can predict a similar condition in the larger organism. That tuberculosis posesses a combination of blood appearances, from which a diagnosis may be made earlier than by any other means that we now possess. That these may be recognized by appropriate microchemical stains and under a high power. That they can be recognized even before the disease manifests itself in the individual. That they are sufficiently in tuberculous person, or even in those with a strong tuberculous predisposition, to enable a diagnosis being made from the blood alone, without knowledge of the history or physical condition. That the real source of the recuperative power is to be found in the leucocytes. That thus far no other pathologic condition has been found which presents similar blood appearances. That to secure an early diagnosis would enable many to avail themselves of favorable climatic changes, and thereby delay or even prevent the destructive results which would otherwise inevitably follow. And, finally, that if future investigations confirm these deductions, we may look forward to a no distant day when, if we expect to detect tuberculosis in its incipiency, we must study the leucocytes.

"I don't see why you don't have happy endings to your novels," said the social cynic. "Happy!" cried the author. "Why, I marry the heroine to the hero every time." "Yes," replied the cynic, "that's just the trouble."—*Chicago Post.*

EMPYEMA OF THE ANTRUM OF HIGHMORE.*

Empyema of the antrum of Highmore has been for years well known to surgeons both in this country and abroad, but was considered rare on account of a want of comprehension of its symptoms. Jourdain, Deschamps, Cooper, and Desault in the eighteenth century had described it, and Deschamps had even advised catheterization of the antrum by the normal orifice, a piece of advice, however, much more easily given than followed. The antrum was already opened through the canine fossa by Lamourier and Desault, while the alveolar process had been used as a point of approach by Meibomius and Cooper. These cases were of the acute and violent type, and were rare, as they are at the present time.

In the records of the Massachusetts General Hospital for the last twenty years I can find but about a dozen cases, and they are all of much the same character. The patient usually entered the hospital complaining of great pain and soreness over the antrum. On examination the whole side of the face was found to be red, swollen and tender,and perhaps fluctuating at some point below the orbit. The question at first arose as to whether the inflammation was in the antrum or external to it, and in the soft tissues only. Carious teeth were now looked for and extracted when found, and the antrum was washed, the fluid entering at the sinus and passing out of the alveolar opening thus made, The antrum was then packed, or perhaps curetted, and the patient allowed to leave the hospital in a week or ten days, with directions to wash the cavity daily through the alveolar opening. Unfortunately, most of these cases occurred so long ago that it is hopeless now to follow their history. No mention of any nasal examination is recorded in any of the older ones, but in most of them carious teeth play an important part. No allusion is made to a possible specific cause, although in the light of our subsequent cases it should, I think, always be considered. Several of these cases occurred in young children from five to seven years of age, and show that where rhinitis persists in childhood antral disease should be thought of. Within the last few years much has been written about the antrum and other sinuses, and light has been thrown upon many obstinate cases of rhinitis which were formerly considered incurable.

Milder cases are usually signalized by a discharge of more or less purulent character from one or the other nostril, usually accompanied by a foul smell, unlike the smell of ozena, to the patient himself. This discharge may, of course, be bilateral if both cavities are involved, but it is not usually so. With this history there arises a consideration of the conditions which may give rise to a unilateral nasal discharge, and these are a foreign body in the nostril, syphilitic disease, and empyema of one of the accessory cavities. On examination of the nose we find the passage clear, thus eliminating foreign bodies. If there is no sign of syphilis, no necrosis of the septum or perforation of its bony wall, we can rule out nasal syphilis with probability. We are then left with an empyema of a sinus, and must make a careful diagnosis as to which accessory cavity is effected. We have to consider in the order of frequency antral, frontal, ethmoid and sphenoid empyema. Disease of the antrum is by far the most common, probably on account of the connection of that cavity with the teeth, many authors believing that it is ten times so frequent as empyema of any other sinus. Of course the first point to be looked for is the location of the discharge. If pus is seen issuing from under the middle turbinate,the diagnosis is simplified, since the frontal sinus, the anterior ethmoidal and the antrum have their outlets in that region. The nostril should, therefore, be carefully cleansed and wiped dry with a pledget of cotton, and then the point of issue of the pus carefully noted. If the pus comes from under the middle turbinate, we next have to differentiate between the antrum,the frontal and anterior ethmoidal

* Frederic C. Cobb, M.D., Boston, Mass., in *International Dental Journal.*

cells. This is often a difficult matter, and many expedients have been resorted to in deciding which cavity is affected.

The presence of necrosed bone in the ethmoid region, and the location of the pain, may determine the diagnosis in favor of that cavity. If these signs are wanting, we are left to make a diagnosis between frontal and antral empyema. The location of the pain is here not absolutely reliable, for frontal pain is met with in empyema of the antrum. We may find redness or tenderness over the frontal sinus, and it is recommended to probe the sinus through its opening in the infundibulum. If this fails, the anatomical exits of the sinuses may be taken advantage of for the purpose of diagnosis in the following way: As the frontal and ethmoidal have their openings at their lowest parts, while the antral opening is at its highest part, it is evident that the two first sinuses are best drained when the head is in an upright position; but the antrum, when the head is inverted. The patient is therefore directed, after his nostrils have been wiped clear of pus, to put his head between his knees, and, if, after a few moments, on assuming the erect position, the nostril is found full of pus, it has probably come from the antrum. The method of transillumination by putting a small electric lamp in the mouth and darkening the room, is sometimes useful, but does not always give certain results; for the variation in the thickness of the walls of the antrum may be considerable, and the skin may be too thick to transmit light well; if these methods fail, recourse must be had to exploratory puncture by the lower meatus, canine fossa, or alveolar process. The former is preferable for the following reasons: First, the wall is usually very thin, and second, there is little or no reactionary inflammation. I have found, in perforating the canine fossa, an immediate swelling of the cheek, which much distorted the face for some days. The passage of the canals was painful, and seemed to increase the swelling. The alveolus is often thick, and therefore more difficult to use as a means of approach. It is, however, on account of its connection with the lowest part of the cavity, and on account of enabling the patient to wash out his own antrum, rapidly becoming the favorite location for puncture.

If it is decided to puncture by the lower meatus, a strong trocar should be introduced below the lower turbinate and turned obliquely outward as far as the nostril will allow, and then pushed through into the sinus. Often, however, the bone is too thick to permit of this proceeding; it is therefore better, I think, to use a trephine or bur propelled by a dental engine. When the trephine has entered, this is at once felt by the sudden lack of resistance, and it is withdrawn, a canula of the same size fitted to an aspirating syringe introduced, and some of the contents of the antrum removed. For accurate diagnosis this proceeding is better than at once washing out the pus, because the fluid passing over the middle meatus may carry with it pus from the infundibulum, which has not necessarily come from the maxillary sinus. Usually the first washing is accompanied by a very considerable discharge of intensely foul-smelling pus.

If the pus be too thick to be drawn through an aspirating tube, washing is in reality the only method of ascertaining its presence. In such cases the nostril should be carefully wiped out before washing the antrum. The odor from pus in long-standing antral empyema is almost unbearable. Frequently in suspected cases at the time of observation no pus is seen in the middle meatus, and the surgeon is obliged to make the patient lower the head in the manner already described, so as to drain the antrum. Often the patient's history—that pus appears when he lies on the sound side—will give the observer a hint as to the best way of obtaining the discharge. I have found a peculiar thin brown mark on the handkerchiefs a valuable guide to diagnosis. This stain has disappeared in the cases treated and cured, and much lessened in those constantly washed. In one case, where nothing could be seen in the nostril, and yet a constant thin brown spot on the handkerchiefs appeared, a probe wound with cotton was inserted under the middle turbinate, and on being removed, the stain on the cotton and on the handkerchiefs was found to correspond very well. The

antrum was opened through a tooth-socket and washed and cured, the stains disappearing from the handkerchief after a few washings.

Mackenzie has suggested that the pus discharge be examined for bacilli, and this has been done, with as yet no important results as regards diagnosis. The staphylococci pyogenes aurens and albus and citreus, and the pneumococcus of Telamon-Frankel, have been found, the latter of interest, since pneumonia is recorded as having followed antral disease. The prognosis in cases as regards time of continuance is not of the best, as untreated suppuration lasting many years or through life. It may give rise to many complications directly due to an affection of its neighboring organs or structures, and indirectly to disease of distant organs. Of the neighboring organs the eye is perhaps most frequently affected, and we have iritis, panophthalmitis, narrowing of the field of vision, orbital abscess, and lid abscess, all following empyema of the antrum. Of the skin of the face, facial abscess and pyodermatoses are mentioned, while in ear and throat acute otitis media (from entrance of pus into the Eustachian tube) and peritonsillar abscess (probably from the passage of pus over the tonsillar region) have been noted. In more distant organs we find reported pneumonia, lung abscess, arthritis, and nephritis. In none of the cases shown by me have any of these complications occurred. As to the question of treatment of empyema of the antrum, there is much diversity of opinion. In the fulminant cases there is no question that a wide opening and drainage are imperative. In latent cases, on the other hand, the results of brilliant surgery do not seem to be as gratifying as in some other localities.

It goes without saying that the cause must be carefully sought if we are to cure the condition. The most common causes of empyema of this sinus are, I think, in the order of frequency, carious teeth, nasal obstruction, and syphilis. Epidemic influenza seems to have played a prominent part in many cases. In most of my patients the teeth have been an important factor, and in two of them antisyphilitic treatment has decided the diagnosis.

With regard to the location of antral puncture authorities differ, although the weight of opinion seems to be in favor of the alveolar opening. Most of my cases have been washed through the lower meatus, although some have been washed through the canine fossa and the alveolar process. The advisability of a large or small opening into the antrum is still in dispute. Most surgeons believe in the former, while Zeim, with his enormous number of cases, advocates the latter. He, however, makes up for the smallness of the opening by using a powerful pump, which sweeps the antrum out under pressure as it were. Bosworth, on the other hand, advises making an opening in the alveolar process large enough to admit the little finger and thoroughly exploring the antrum. This certainly seems a most rational method of procedure.

INFLAMMATION OF BONE.*

In discussing inflammation of bone tissue I purpose to take issue with well recognized authorities on some points regarding this particular inflammation. Inflammation of bone tissue presents the same phenomena characterizing inflammation of other tissues, and the same pathologic changes, and there is no particular difference in the cause,—all inflammations depending upon a pathologic condition. Although the focus of infection is usually in the medullary canal or medullary substance in the cancellous tissue, the entire structure, medulla, bone and periosteum, is soon involved in the process. It is of little consequence, therefore, where the focus of infection is from a clinical standpoint; but from a medico-legal and an etiologic consideration it is of paramount importance.

I shall confine myself to the discus-

*Andrew L. Fulton, M.D., Kansas City, Mo., in the *Railway Surgeon.*

sion of the so-called spontaneous suppurative osteomyelitis and to the tubercular variety of osteomyelitis. There is scarcely any dispute regarding the etiology in cases of direct traumatic, suppurative osteomyelitis, and it is generally conceded that the cause of spontaneous osteomyelitis is the arrest of infected micro-organisms that have made their way into the circulation from a more or less remote suppurative process or abscess cavity, a metastasis, or, through the intestinal tract or mucous membrane of the respiratory tract. Consistent with this I have for several years held to the opinion as a reasonable and logical conclusion that the tubercular type of inflammation has its origin in and is conveyed to a *locus minoris resistentiæ* from an antecedent pathologic condition. I shall further assume, and not without good clinical evidence, that the suppurative and tubercular character of inflammation respectively present the same anatomic features and like conditions as to the age of the patient and the point of infection. If the one is not due in any sense to a slight trauma without a wound, the other, tubercular osteomyelitis, will justify the same conclusion.

Acute spontaneous suppurative osteomyelitis is almost exclusively confined to children and young adults prior to the bony union of the epiphysis with the diaphysis, and next to the tubercular inflammation is most frequent of all inflammatory disease of bone. The point of departure of the disease, or the focus of infection, in these cases is either in the medullary substance in the canal of the long bones or in the same substance in the diaphysis near the epiphyseal line. The anatomic peculiarities of bone in children favor the development of the disease. The large, dilated capillaries, active circulation and what seem to be terminal or end vessels of the diaphysis at its junction with the epiphysis are anatomic conditions favorable to the arrest of the infected leucocytes or emboli; the morbid process having originated in this way in the medullary tissue, extends to the bony structure or adjacent bone tissue, then to the periosteum and para-periosteal tissue, and forms an abscess which marks the progress of the disease.

Aside from the cases in which we have direct infection from compound fractures or wounds, the cause of the suppuration is obscure. It is a well-known clinical fact, however, that exposure to cold from bathing in cold water, over-heating and rapid cooling, lying on damp, cold ground and the like, may cause apparently healthy children to suddenly contract suppurative osteomyelitis. There seems to be something still unknown regarding the character, origin and cause of pus formation where there is no external wound open, fracture or pre-existing suppuration elsewhere. We know from clinical experience, however, that acute attacks of suppurative osteomyelitis may occur at any time without the slightest apparent cause, running a rapid and very destructive course. The reason for the entrance of the pus microbes into the general circulation is a matter of great wonder, but the fact that the micro-organism is carried to a particularly vulnerable issue is not so strange.

The following clinical features usually constitute the picture of a typical case of suppurative osteomyelitis. The child, or young adult in ordinary good health, is suddenly seized with severe pain at or near the epiphyseal line of a long bone; a chill almost immediately follows. The pain increases and becomes excruciating and is of a throbbing character, and while not exclusively confined to the focus of infection, is sufficiently limited to direct our attention to the area involved, knowing that, as a rule, the primary infection is at or near the distal side of the epiphyseal line, where there is a positively well-defined point of tenderness on pressure, marking the involvement of the periosteum. All the symptoms of inflammation will not be observed until the soft parts are involved on account of the infected focus being walled in by the bony structure surrounding it. In the cases where we have neglected surgical interference, or have been mistaken in the diagnosis, we will be guided by the continuous rise of temperature and the distressed appearance of the patient (typhoid symptoms), symptoms that should always be looked upon with suspicion. The swelling, redness, etc., are absent in the early stage of the disease on account of the

primary inflammation being located in the interior of the bone, but so soon as the inflammatory product has tunneled through the osseous tissue, all the other symptoms of inflammation and suppuration are at once manifest. These symptoms should never be allowed to supervene unprotected by surgical recourse. I have frequently observed these clinical features developing rapidly in children who had been exposed to cold, and terminating in the formation of large pus cavities, without suspicion of anything except ordinary malarial fever. In these cases there was positively no assignable cause, except the spontaneous development through the agency of the pyogenic cocci, no history of injury of any kind having been observed.

Tubercular osteomyelitis, while much more common than suppurative inflammation, often terminates in the same way that acute suppurative osteomyelitis does. It is, however, especially chronic in its nature. The only real difference between the two diseases is pathologic and etiologic. Instead of the destructive pyogenic cocci incident to suppurative myelitis, we observe the tubercle bacilli which transform the normal connective tissue cells into embryonal or granulation tissue cells. The subsequent course after the focus of infection is established depends much upon the extent of the inflammation and rapidity of its course. The tubercular disease may pursue a course quite like suppurative osteomyelitis when the inflammatory product far exceeds the resorption capacity of the granulation tissue, as may be observed in many of the cases of hip-joint disease. The only diagnostic symptom in such cases, in fact, in any case, is the presence of the tubercle bacilli. When there is mixed infection—pyogenic cocci and tubercle bacilli—we should be able to demonstrate the pus micro-organism and the bacilli of tuberculosis by culture. In other respects, such as the anatomic conditions, the age of the patient, and the area of infection, there is little difference between the two diseases. In our clinical observation, however, we may be able to distinguish fairly correctly by the acute attack, the great pain and the higher temperature in the suppurative variety, as compared with the chronicity and lower temperature, with an evening rise and failing health, due probably to a primary infection elsewhere, denoting secondary metastatic tuberculosis in the medullary substance of the bone.

So far as the etiology is concerned I claim that no case of tuberculosis depends upon trauma, slight or severe. It has not been claimed that tuberculosis of the lungs or other glands depend upon traumatism as an exciting cause, yet bone is of the same histologic structure and presents the same pathologic change as lung tissue and infection in both is the same. There is no doubt in my mind that the medulla of the diaphysis is the most susceptible to tubercular infection of any of the anatomic structures in children. Authorities, in speaking of tuberculous bone, use the stereotyped expression, "it is often due to slight trauma;" in other words, a trauma that has not been observed. Taking into account the anatomic features already spoken of in connection with suppurative osteomyelitis, and the deep-seated point of infection, I have always been constrained to believe a slight injury is simply the means of calling attention to an existing focus of infection in the medulla of the diaphysis of bone and has nothing to do with the origin of the disease. The tuberculosis has been established. Slight periosteal inflammation has set up over the focus of infection in the medulla, and an insignificant blow merely marks its location. Tuberculosis does not develop where a child is apt to sustain an injury. Moreover, if it were due to trauma, children running about striking against this or that a hundred times or more in a day, would be quite liable to contract tuberculous trouble of the bones. On the contrary, exceedingly few children are afflicted with tuberculous disease of bones compared to the large number who contract other diseases when exposed. It is fair to presume that if it is ever due to slight trauma it would begin in the periosteum or more compact tissue of bone, a location where we seldom, if ever, find the disease primarily. I maintain that it depends upon a predisposition and pre-existing tubercle that finds a vulnerable structure where the infection is lodged, and

the reason we attribute it to slight injury is that there is a tender spot, a diagnostic symptom, on deep pressure of periosteal inflammation having been established following the disease in the deeper portion of the bone tissue, namely, the medullary substance. The patient, in running about, probably strikes the limb against something, over the point of tenderness, and in this way makes the first complaint, through which the disease is attributed to that special injury, when such injury had nothing to do with the origin of the disease, except in a damage suit for personal injury.

In all suspicious cases of bone disease the surgeon should be constantly on the watch for the development of inflammation, and so early as possible, after the first evidence of tenderness serving to locate the infected area is observed, surgical interference should be resorted to, either by means of parenchymatous injection of iodoform emulsion, or the more radical operation for the removal of the limited foci in the medullary substance. There is no possible means of escape for the non-absorbable product of inflammation except by penetrating the bony structure externally, then the periosteum, and finally the para-periosteal tissue. This in young adults is often quite tedious, and very great destruction may occur before nature has accomplished the necessary results to effect a cure. It is in these cases that we should be particular in making our diagnosis.

The preparation in these cases should be quite as thorough as if we were preparing for an abdominal section. Perfect cleanliness, and the use of antiseptics cannot be too strictly observed. The point of infection having first been detected and the field of operation rendered absolutely aseptic, and the limb if possible rendered avascular, an incision should be made down to the bone. This should be trephined and the product of the inflammatory process cleared out, after which the bone cavity should be filled with iodoform, and the wound packed with iodoform gauze and closed up, with the exception of the drainage opening. Dr. Nicholas Senn's apparatus for forcible injections of iodoform emulsion is very useful in cases of limited tuberculous foci. Even if we are mistaken in our diagnosis little harm, if any, will be done by the operation carefully performed. If the inflammatory trouble exists great benefit will be accomplished, and much tissue saved that would under other circumstances have been destroyed by the destructive inflammatory process, to say nothing of the danger to the life of the patient.

In conclusion I desire to emphasize a few salient points.

First—Neither spontaneous suppurative osteo-myelitis nor tubercular osteomyelitis originates in the compact tissue of bone primarily.

Second—The structures involved in the primary infection in each are exact anatomic counterparts.

Third—The conditions under which the infection originates are alike.

Fourth—The infection in both forms of inflammation is conveyed to a *locus minoris resistentiæ*, under like conditions.

Fifth—The area of bone tissue involved is far remote from the part where a slight trauma could obtain through the blood current.

Sixth—The infection and inflammation always exist prior to the injury supposed to produce it.

Seventh—*Restitutio ad integerum* without the formation of an abcess never occurs.

Eighth—To preserve bone tissue and protect the health or life of the patient an early and thorough operation is imperative.

O'Hara—She was a good wife to me, poor woman. Many's the word of good advice she gave me.

McGoogan—Thrue for yez, an' many's the time Oi've heard her advizin' yez when Oi lived in the house beyant, a mile up the road, ochone!—*Troy Times.*

Archie, who had never seen gas-jets, had been away on a little visit. "And were you careful about going near the lamps?" asked his mamma. "They don't have lamps," replied the little fellow. "They just light the end of the towel-rack."—*Exchange.*

Miss Justout—What do you consider the marriageable age?

Outal Knight—Anywhere between the seminary and the cemetery.—*Truth.*

SOCIETY REPORTS.

MEETING OF THE DELAWARE COUNTY MEDICAL SOCIETY, CHESTER, PA.

November 19, 1896.

Report of the Board of Censors returned and approved.

A resolution was presented to the society by Dr. Francis F. Forwood, looking to the appointment of a committee to take charge of the registration of nurses, and to establish a bureau of registration.

DISCUSSION.

DR. JEFFERIS. The urgent necessity for some action of this kind has suggested itself to me because of my personal knowledge of one patient in this town who lost her life on account of the criminal negligence or inexperience of the nurse. Only a few days since I called to see an obstetric patient, whom I had left in good condition the day before. Found the patient with a temperature of 105°; and upon questioning the nurse, discovered that she had packed against the vaginal opening a cloth saturated with ordinary lard, thus retaining the secretions and rendering the patient liable to septic infection. In addition to this she had, contrary to my injunction, used cool water for vaginal flushing. There are forty such women in Chester. Such a woman ought not to be allowed to attend obstetric cases. We certainly need a nurses' exchange, where a reliable nurse can be procured in an emergency. I have 'phoned around for an hour at such a time in the endeavor to procure a suitable nurse. I am glad the old description of nurse is dying out, though, in justice to them, I must say they are not all bad.

DR. FRANCIS F. FORWOOD.—In a town in Maryland where I formerly practiced medicine, a plan similar to the one outlined in the resolution was carried out with marked success. Philadelphia exchanges are managed in a very satisfactory manner. At such bureaus one can get all information necessary of any special nurse whose service it might be desirable to obtain, such as date of expiratiou of present services, character of the disease for which the service was last required, whether contagious or otherwise, etc. Generally, two weeks are allowed to elapse after attending contagious cases before taking new service. A small charge is made for such registration, the amount of which is fixed.

DR. ULRICH.—This matter belongs to the province of this society. The fee at the College of Physicians is, I think, $3. When a nurse is provided by the bureau of registration a fee of $1 is charged to the person making application. An important feature of these exchanges is the reports of the physicians upon the work of the nurses in attendance upon the patients under their charge. This is provided for by means of blank forms which the physician is required to fill out.

DR. W. KNOWLES EVANS.—I have a case to report similar to that of Dr. Jefferis, but in which the treatment by the nurse was carried out further and the inner vaginal walls were anointed with rancid lard.

DR. ULRICH.—This board for the registration of nurses should be entirely under the control of physicians. Dr. Keen, with whom I have talked, has made a careful study of this question and from him I have acquired many valuable points. * * * *

Resolution was adopted and Dr. Stoever, Dr. Francis F. Forwood, and Dr. Maison were appointed to serve.

It was suggested by Dr. Ulrich that copies of the by-laws of the exchanges in Philadelphia should be procured, and the committee was given full power to act, subject to the approval of the society.

Dr. Francis F. Forwood read a paper on "Observations in General and Local Anesthesia."

DISCUSSION.

DR. MAISON.—Do I understand Dr. Forwood to assert that the preparation mentioned—eucain—is more satisfactory and can be substituted for cocain in all cases?

DR. FORWOOD.—It presents advantages over cocain in all surgical cases. Its action is just as powerful without the danger of concentration of a cocain solution and its consequent poisonous effect on the nerve cells. It has the anesthetic effect without the depressing action on the heart which is common with the use of cocain.

DR. ULRICH.—How many injections are necessary to produce the desired effect?

DR. FORWOOD.—My plan of injecting is as follows: If the tissue to be incised is inflammatory, I begin back in the healthy tissue, enter the needle and inject a few drops of solution. This makes a wheal the circumference of which represents an anesthetic area. Then using the point of this anesthetic area which is nearest the line of incision, I inject again a few drops, and so on until I have made an anesthetic area through which I desire to cut. The operation is then absolutely painless. Dr. Schleich has used the formula in 3500 cases without any untoward results.

DR. J. L. FORWOOD.—What extensive operations has Dr. Schleich performed?

DR. FRANCIS FORWOOD.—Dr. Schleich has performed amputation of the leg, and

breast, removal of hemorrhoids, hydrocele, etc., with this anesthetic solution. In performing operations in which deeper tissues are included, deep and extensive infiltrations are used, and it is here especially that the method of local anesthesia under discussion shows to advantage over any other process for producing local anesthesia known. Cocain is a cell poison and in concentrated solution produces necrotic tissue. In the amounts necessary to produce anesthetic results similar to those obtained by the Schleich fluid, it is always dangerous, the strength of the Schleich fluid being one-fifth of one per cent. against five per cent. in the solutions of cocain formerly in use.

I met Dr. Schleich when he was in Philadelphia, and saw him do the open operation on hydrocele, also saw him operate on hemorrhoids. In the latter operation he began his injection in the manner referred to above, around the base of the tumor, and later injected the tumor to five times its size with the anesthetic fluid. Then the tumor was incised with absolutely no pain and the base sewed up, making a clean incision. I believe that in nine-tenths of the cases of minor surgery will this method substitute the knife and general anesthesia.

DR. MCMASTERS.—In the excision of a non-inflammatory tumor how far back do you make the first puncture?

DR. FORWOOD.—Commonly about one inch. The injection produces pressure upon the nerve structure, nerve cells and small vessels. I believe that this pressure on nerve structure is a factor in the anesthetic effect, and its action on the small vessels prevents hemorrhage.

DR. J. L. FORWOOD.—In operation on structures such as a sebaceous cyst, do you depend upon subcutaneous injections or carry them deeper?

DR. FRANCIS FORWOOD.—Use subcutaneous injections primarily, and follow with deeper. In performing more extensive section the method commonly pursued is to precede the knife with the needle, producing your anesthetic areas in the direction to be followed by the knife. This is the method followed by Dr. Schleich and the innocuousness of the solution renders the free use of it possible. I must confess I was skeptical at first in regard to the method, but my first operation upon an ingrown toe nail, than which there is nothing more sensitive, convinced me.

There are two good reasons why the use of cocain causes death of tissues. First, it is an active cell poison. Second, it is generally used in a highly concentrated solution.

DR. BARTLESON.—I am using eucain entirely now.

DR. FRANCIS FORWOOD.—I assisted Dr. J. L. Forwood in removing nearly the entire half of the upper jaw, as result of necrosis from cocain injection.

DR. JEFFERIS.—What is the formula you commonly use for preparing the anesthetic?

DR. FORWOOD.—

Eucain hydrochlor (Schering)	gr. 1½
Morphia muriat	gr. 3
Sodii chlorid	gr. 3
Sterilized distilled water . .	oz. 3 drams 5

This is the No. 2 solution suitable for ordinary cases. For stronger solution double the amount of eucain.

DR. JEFFERIS.—How much of the normal solution is it safe to use?

DR. FORWOOD.—You can use fifty syringefuls before reaching the normal dose of cocain.

DR. J. L. FORWOOD.—The trouble with cocain is its uncertainty. I had a case recently in which I undertook in my office to remove a small tumor after injecting one-half grain cocain. I made the puncture in three places. Immediately after the injection the patient became white, and the heart nearly stopped. I could not operate and the patient was ill several days in consequence of the injection.

Some time afterward I had another case, in which I endeavored to operate under cocain for some long continued trouble in the lower bowel. The bowel was washed out previously and I injected with a blunt-pointed syringe a solution of cocain containing one grain, afterward rubbing it around the inside of the bowel with my finger. The patient became pale and I thought he was going to die. I had great trouble to bring him around, and had to postpone operation to a late date, when I operated under ether.

The urethra is inconvenient for the use of ordinary cocain solution, as it is almost impossible to remove the fluid from its walls sufficiently to get the prompt anesthetic effects of cocain solution. It would seem that a solution like the one mentioned would obviate this difficulty on account of the freedom with which it could be used. You could flood the parts with the solution without expecting any ill result. I am afraid of cocain and have largely discontinued its use.

A curious cause of death in a child transpired at an inquest, when it was elicited as the result of a *post-mortem* examination by Dr. Neild that the cause of death was due to hemorrhage, the result of puncture of the heart by a needle. The mother, it appears, was in the habit of carrying needles in her bosom, and probably the needle had stuck into the child while she was nursing it.—*British Medical Journal.*

The influence of sugar on the energy of the muscles has been investigated by Schumberg (Annals of Hygiene). He used mossosergograph, and found that the sugar produced no perceptible effect on fresh, unfatigued muscles, but that muscles fatigued from previous severe exertion were strengthened to a noticeable degree. This effect was attained whether the muscles were strong or weak.

PERISCOPE.

NEWS AND MISCELLANY.

Dr. Thomas H. Manley, whose researches in hernia and other special surgical lines have given him a national reputation, has become one of the teachers in the New York School of Clinical Medicine.

Petroleum is extensively used in Russia as a local application for the cure of gout, rheumatism, eczema and other chronic skin diseases. The city of Elizabethpol conducts an establishment called "Naphthalan," on the style of a watering-place where 500 to 600 patients are annually treated. Gratifying results are claimed.—*Am. Med.-Surg. Bulletin.*

The regular meeting of the section on pathology of the Buffalo Academy of Medicine was held December 15, 1896. Program: Exhibition of Gynecological Specimens, H. E. Hayd, M.D.; Perforation of the Uterus, Sidney Dunham, M.D.; Perforating Ulcer of the Intestine, N. G. Russell, M.D.; Comparative Anatomy of the Cecum—An Appendix Vermiformis in a Dog, A. T. Kerr, Jr.

A novel experiment was recently tried in Brooklyn, where meetings of public school teachers with the parents of the children under instruction have just been held, apparently with good results. Certainly the idea is an excellent one. The education of the child must proceed on the co-operative principle. Home and school need to be in touch one with the other to secure the best results for both.—*New York Observer.*

Dr. Boardman Reed, who has offices in the professional building at 1831-33 Chestnut street, has established a laboratory for the analysis of stomach fluids. He is prepared to analyze and to make a written report upon any such fluids which may be submitted to him; and when desired he will send a nurse who is thoroughly trained in such work, to take up the contents of the stomach after a test meal.

The Twelfth International Medical Congress will be held at Moscow, August 19-26, 1897. Claudius H. Mastin, M.D., of Mobile, Ala., has been requested, and has consented to serve as one of the members of the American National Committee of the Congress. The Central (Moscow) Executive Committee consists of the following: President, Prof. I. F. Klein; Vice-President, Prof. A. J. Kojownikow; Treasurer, Prof. N. F. Filatow; Secretary General, Prof. W. K. Roth; Secretaries, Prof. P. I. Diakonow, Prof. W. A. Tikhomirow, Prof. I. I. Heyding; Members, Prof. S. S. Korsakow, Prof. J. F. Ognew, Prof. W. D. Cherwinsky. It is officially announced that preparations are being made for the reduction of Transatlantic steamer and European railroad fares.

The Treatment of cases of acute anemia by injections of salt water is approved by Maygrier. He said that among the means at our disposal to struggle against hemorrhage of a grave character we have added, within the last two or three years, injections of artificial serum into the cellular tissue, or even into the veins directly. Lately, he had witnessed in his own practice most astonishing results from this method, and he would add, with other clinicians (Thomson, H. Spencer, Smith, Horrocks, etc.), that there should be no fear of injecting strong doses or of renewing them frequently. The patient who furnished him with the opportunity of trying the method was a woman, who was brought to the hospital in a dying state from placenta previa. The first attempts at provoking a delivery were accompanied by such grave attacks of syncope that death seemed to be imminent. He injected immediately two quarts of salt water directly into the vein of the arm at an interval of twenty minutes. The effect was magical, the woman who was apparently dead seeming to come back by a kind of resurrection. Shortly afterwards, parturient pains came on, and the child was expelled. The consequent loss of blood brought on fainting, and two more quarts were injected with similar good effect. But towards evening the patient showed again signs of sinking, and the injections were repeated, and this time with permanent effect, so that in the one day six quarts of artificial serum had been injected. If women are brought to us in a lamentable state of anemia, their condition ought to be improved by injections of serum before proceeding to deliver them. Certain *accoucheurs* have a grave dread of intravenous injections, but their fears were, in his mind, exaggerated. The mode of operating is of the simplest. The vein is laid bare and an opening made in it for the point of the canula. This canula is connected with the reservoir containing the serum by means of a tube. Care should be taken to exclude all air and to properly sterilize the instruments. If at any moment blood flowed back into the canula because the reservoir was not held sufficiently high (three feet), it might coagulate, and the danger of injecting a clot would be very great. In such a case the instrument should be withdrawn and all the blood emptied and then replaced.—*Med. Press.*